

14-03 WO.sequence listing.txt
SEQUENCE LISTING

<110> University of Georgia Research Foundation, Inc
Mohnen, Debra
Hahn, Michael G.
Kolli, Venkata S.K.
Doong, Ron L.
Sterling, Jason D.

<120> Galacturonosyltransferases, nucleic acids encoding same, and uses therefor

<130> 14-03 WO

<140> Not assigned
<141> 2004-02-05

<150> US 60/445,539
<151> 2003-02-06

<160> 50

<170> PatentIn version 3.2

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Glu Lys Leu Arg Ala Met Gly Gln Val Leu Ala Lys Ala Lys Met Gln
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Ala Gln Leu Ala Ala Lys Thr Ile Pro Asn Pro Ile His Cys Leu Ser
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 370 375 380
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 Met Phe Asp Leu Lys Glu Trp Lys Lys Arg Asp Ile Thr Gly Ile Tyr
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Lys Lys Asp Ile Glu Asn Ala Ala Val Val His Tyr Asn Gly Asn Met
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Tyr Gly Ser Tyr Cys Leu Trp Arg Glu Glu Asn Lys Glu Pro Met Lys
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Tyr Tyr Pro Ser Ile Ala Lys Met Pro Ser Gln Ser Lys Leu Thr Arg
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Ser Gln Asp Ala Asp Leu Pro Pro Gln Val Asp Lys Lys Leu Gln Lys
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 85 90 95

Asp Asp Thr His Ser His Thr Asp Ile Ser Ile Lys Gln Val Thr His
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 195 200 205

Ser Asp Leu Pro Lys Thr Ala Ile Glu Lys Leu Lys Ala Met Glu Gln
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Thr Leu Ala Lys Gly Lys Gln Ile Gln Asp Asp Cys Ser Thr Val Val
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Lys Lys Leu Arg Ala Met Leu His Ser Ala Asp Glu Gln Leu Arg Val
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His Lys Lys Gln Thr Met Phe Leu Thr Gln Leu Thr Ala Lys Thr Ile
 260 265 270

Pro Lys Gly Leu His Cys Leu Pro Leu Arg Leu Thr Thr Asp Tyr Tyr
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Gln Asn Val Glu Glu Phe Thr Trp Leu Asn Ser Ser Tyr Ser Pro Val
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Leu Lys Gln Leu Ser Ser Arg Ser Met Ile Asp Tyr Tyr Phe Arg Ala
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His His Thr Asn Ser Asp Thr Asn Leu Lys Phe Arg Asn Pro Lys Tyr
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Leu Ser Ile Leu Asn His Leu Arg Phe Tyr Leu Pro Glu Ile Phe Pro
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Gly Trp Ala Tyr Gly Met Asn Val Phe Asp Leu Asp Glu Trp Lys Arg
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 530 535 540

Trp Arg Arg Thr Tyr Pro Leu Asp Arg Lys Trp His Ile Leu Gly Leu
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Gly Tyr Asn Pro Ser Val Asn Gln Arg Asp Ile Glu Arg Ala Ala Val
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aagagaccat tgtggaaagc tgggagctta ccaatagggt ggttgacttt ctataggcaa 1560
acattagcat tggacaagag atggcatgtg atgggggttag gtcgcgaatc aggagtcaaa 1620
gcggttgaca tcgaacaagc ggcagttata cactacgatg gggtcatgaa gccgtggttg 1680
gacattggaa aagagaatta caaacgttac tggaaacatac acgtccctta ccatcacacc 1740
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<210> 8

<211> 589

<212> PRT

<213> Arabidopsis thaliana

<400> 8

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1 5 10 15

14-03 WO.sequence listing.txt

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 20 25 30
 Ser Ile Thr Pro Val Gly Arg Arg Glu Phe Ile Glu Glu Leu Ser Lys
 35 40 45
 Ile Arg Phe Thr Thr Asn Asp Leu Arg Leu Ser Ala Ile Glu His Glu
 50 55 60
 Asp Gly Glu Gly Leu Lys Gly Pro Arg Leu Ile Leu Phe Lys Asp Gly
 65 70 75 80
 Glu Phe Asn Ser Ser Ala Glu Ser Asp Gly Gly Asn Thr Tyr Lys Asn
 85 90 95
 Arg Glu Glu Gln Val Ile Val Ser Gln Lys Met Thr Val Ser Ser Asp
 100 105 110
 Glu Lys Gly Gln Ile Leu Pro Thr Val Asn Gln Leu Ala Asn Lys Thr
 115 120 125
 Asp Phe Lys Pro Pro Leu Ser Lys Gly Glu Lys Asn Thr Arg Val Gln
 130 135 140
 Pro Asp Arg Ala Thr Asp Val Lys Thr Lys Glu Ile Arg Asp Lys Ile
 145 150 155 160
 Ile Gln Ala Lys Ala Tyr Leu Asn Phe Ala Pro Pro Gly Ser Asn Ser
 165 170 175
 Gln Val Val Lys Glu Leu Arg Gly Arg Leu Lys Glu Leu Glu Arg Ser
 180 185 190
 Val Gly Asp Ala Thr Lys Asp Lys Asp Leu Ser Lys Gly Ala Leu Arg
 195 200 205
 Arg Val Lys Pro Met Glu Asn Val Leu Tyr Lys Ala Ser Arg Val Phe
 210 215 220
 Asn Asn Cys Pro Ala Ile Ala Thr Lys Leu Arg Ala Met Asn Tyr Asn
 225 230 235 240
 Thr Glu Glu Gln Val Gln Ala Gln Lys Asn Gln Ala Ala Tyr Leu Met
 245 250 255
 Gln Leu Ala Ala Arg Thr Thr Pro Lys Gly Leu His Cys Leu Ser Met
 260 265 270

14-03 WO.sequence listing.txt

Arg Leu Thr Ser Glu Tyr Phe Ser Leu Asp Pro Glu Lys Arg Gln Met
 275 280 285
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 290 295 300
 Phe Ser Asp Asn Val Leu Ala Ser Ser Val Val Val Asn Ser Thr Ile
 305 310 315 320
 Ser Ser Ser Lys Glu Pro Glu Arg Ile Val Phe His Val Val Thr Asp
 325 330 335
 Ser Leu Asn Tyr Pro Ala Ile Ser Met Trp Phe Leu Leu Asn Ile Gln
 340 345 350
 Ser Lys Ala Thr Ile Gln Ile Leu Asn Ile Asp Asp Met Asp Val Leu
 355 360 365
 Pro Arg Asp Tyr Asp Gln Leu Leu Met Lys Gln Asn Ser Asn Asp Pro
 370 375 380
 Arg Phe Ile Ser Thr Leu Asn His Ala Arg Phe Tyr Leu Pro Asp Ile
 385 390 395 400
 Phe Pro Gly Leu Asn Lys Met Val Leu Leu Asp His Asp Val Val Val
 405 410 415
 Gln Arg Asp Leu Ser Arg Leu Trp Ser Ile Asp Met Lys Gly Lys Val
 420 425 430
 Val Gly Ala Val Glu Thr Cys Leu Glu Gly Glu Ser Ser Phe Arg Ser
 435 440 445
 Met Ser Thr Phe Ile Asn Phe Ser Asp Thr Trp Val Ala Gly Lys Phe
 450 455 460
 Ser Pro Arg Ala Cys Thr Trp Ala Phe Gly Met Asn Leu Ile Asp Leu
 465 470 475 480
 Glu Glu Trp Arg Ile Arg Lys Leu Thr Ser Thr Tyr Ile Lys Tyr Phe
 485 490 495
 Asn Leu Gly Thr Lys Arg Pro Leu Trp Lys Ala Gly Ser Leu Pro Ile
 500 505 510
 Gly Trp Leu Thr Phe Tyr Arg Gln Thr Leu Ala Leu Asp Lys Arg Trp

515

14-03 WO.sequence listing.txt
520 525

His Val Met Gly Leu Gly Arg Glu Ser Gly Val Lys Ala Val Asp Ile
530 535 540

Glu Gln Ala Ala Val Ile His Tyr Asp Gly Val Met Lys Pro Trp Leu
545 550 555 560

Asp Ile Gly Lys Glu Asn Tyr Lys Arg Tyr Trp Asn Ile His Val Pro
565 570 575

Tyr His His Thr Tyr Leu Gln Gln Cys Asn Leu Gln Ala
580 585

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<211> 1614
<212> DNA
<213> Arabidopsis thaliana

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tctcctccc atttaactt cacggaagag gtcacaagtg cttcctcctt ctctaggcag 240
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tcacctagac ttgtcgacaa caacctctac cacttctgca tcttctcgga caacgtgatt 720
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14-03 WO.sequence listing.txt

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tataatggta acatgaagcc ttggctaaag ctggctattg gtaggtataa acctttctgg 1560
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<210> 10
<211> 537
<212> PRT
<213> Arabidopsis thaliana

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<400> 10

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Met Arg Arg Trp Pro Val Asp His Arg Arg Arg Gly Arg Arg Arg Leu
1 5 10 15

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Ser Ser Trp Ile Trp Phe Leu Leu Gly Ser Phe Ser Val Ala Gly Leu
20 25 30

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Val Leu Phe Ile Val Gln His Tyr His His Gln Gln Asp Pro Ser Gln
35 40 45

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Leu Leu Leu Glu Arg Asp Thr Arg Thr Glu Met Val Ser Pro Pro His
50 55 60

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Leu Asn Phe Thr Glu Glu Val Thr Ser Ala Ser Ser Phe Ser Arg Gln
65 70 75 80

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Leu Ala Glu Gln Met Thr Leu Ala Lys Ala Tyr Val Phe Ile Ala Lys
85 90 95

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Glu His Asn Asn Leu His Leu Ala Trp Glu Leu Ser Ser Lys Ile Arg
100 105 110

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Ser Cys Gln Leu Leu Leu Ser Lys Ala Ala Met Arg Gly Gln Pro Ile
115 120 125

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Ser Phe Asp Glu Ala Lys Pro Ile Ile Thr Gly Leu Ser Ala Leu Ile
130 135 140

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Tyr Lys Ala Gln Asp Ala His Tyr Asp Ile Ala Thr Thr Met Met Thr
145 150 155 160

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14-03 WO.sequence listing.txt

Met Lys Ser His Ile Gln Ala Leu Glu Glu Arg Ala Asn Ala Ala Thr
 165 170 175
 Val Gln Thr Thr Ile Phe Gly Gln Leu Val Ala Glu Ala Leu Pro Lys
 180 185 190
 Ser Leu His Cys Leu Thr Ile Lys Leu Thr Ser Asp Trp Val Thr Glu
 195 200 205
 Pro Ser Arg His Glu Leu Ala Asp Glu Asn Arg Asn Ser Pro Arg Leu
 210 215 220
 Val Asp Asn Asn Leu Tyr His Phe Cys Ile Phe Ser Asp Asn Val Ile
 225 230 235 240
 Ala Thr Ser Val Val Val Asn Ser Thr Val Ser Asn Ala Asp His Pro
 245 250 255
 Lys Gln Leu Val Phe His Ile Val Thr Asn Arg Val Ser Tyr Lys Ala
 260 265 270
 Met Gln Ala Trp Phe Leu Ser Asn Asp Phe Lys Gly Ser Ala Ile Glu
 275 280 285
 Ile Arg Ser Val Glu Glu Phe Ser Trp Leu Asn Ala Ser Tyr Ser Pro
 290 295 300
 Val Val Lys Gln Leu Leu Asp Thr Asp Ala Arg Ala Tyr Tyr Phe Gly
 305 310 315 320
 Glu Gln Thr Ser Gln Asp Thr Ile Ser Glu Pro Lys Val Arg Asn Pro
 325 330 335
 Lys Tyr Leu Ser Leu Leu Asn His Leu Arg Phe Tyr Ile Pro Glu Ile
 340 345 350
 Tyr Pro Gln Leu Glu Lys Ile Val Phe Leu Asp Asp Asp Val Val Val
 355 360 365
 Gln Lys Asp Leu Thr Pro Leu Phe Ser Leu Asp Leu His Gly Asn Val
 370 375 380
 Asn Gly Ala Val Glu Thr Cys Leu Glu Ala Phe His Arg Tyr Tyr Lys
 385 390 395 400
 Tyr Leu Asn Phe Ser Asn Pro Leu Ile Ser Ser Lys Phe Asp Pro Gln
 405 410 415

14-03 WO.sequence listing.txt

Ala Cys Gly Trp Ala Phe Gly Met Asn Val Phe Asp Leu Ile Ala Trp
 420 425 430

Arg Asn Ala Asn Val Thr Ala Arg Tyr His Tyr Trp Gln Asp Gln Asn
 435 440 445

Arg Glu Arg Thr Leu Trp Lys Leu Gly Thr Leu Pro Pro Gly Leu Leu
 450 455 460

Ser Phe Tyr Gly Leu Thr Glu Pro Leu Asp Arg Arg Trp His Val Leu
 465 470 475 480

Gly Leu Gly Tyr Asp Val Asn Ile Asp Asn Arg Leu Ile Glu Thr Ala
 485 490 495

Ala Val Ile His Tyr Asn Gly Asn Met Lys Pro Trp Leu Lys Leu Ala
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 515 520 525

Pro Tyr Leu Gln Asp Cys Val Thr Ala
 530 535

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 <211> 1611
 <212> DNA
 <213> Arabidopsis thaliana

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 tcgaaactca cggataacag tctctaccat ttctgtgtgt tttccgataa cattattgct 720

14-03 WO.sequence listing.txt

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<210> 12
 <211> 536
 <212> PRT
 <213> Arabidopsis thaliana

<400> 12

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 20 25 30

Phe Phe Leu Ile Leu Ser Lys Ala Gly His Ile Glu Pro Arg Pro Ser
 35 40 45

Ile Pro Lys Arg Arg Tyr Arg Asn Asp Lys Phe Val Glu Gly Met Asn
 50 55 60

Met Thr Glu Glu Met Leu Ser Pro Thr Ser Val Ala Arg Gln Val Asn
 65 70 75 80

Asp Gln Ile Ala Leu Ala Lys Ala Phe Val Val Ile Ala Lys Glu Ser
 85 90 95

14-03 WO.sequence listing.txt

Lys Asn Leu Gln Phe Ala Trp Asp Leu Ser Ala Gln Ile Arg Asn Ser
 100 105 110
 Gln Leu Leu Leu Ser Ser Ala Ala Thr Arg Arg Ser Pro Leu Thr Val
 115 120 125
 Leu Glu Ser Glu Ser Thr Ile Arg Asp Met Ala Val Leu Leu Tyr Gln
 130 135 140
 Ala Gln Gln Leu His Tyr Asp Ser Ala Thr Met Ile Met Arg Leu Lys
 145 150 155 160
 Ala Ser Ile Gln Ala Leu Glu Glu Gln Met Ser Ser Val Ser Glu Lys
 165 170 175
 Ser Ser Lys Tyr Gly Gln Ile Ala Ala Glu Glu Val Pro Lys Ser Leu
 180 185 190
 Tyr Cys Leu Gly Val Arg Leu Thr Thr Glu Trp Phe Gln Asn Leu Asp
 195 200 205
 Leu Gln Arg Thr Leu Lys Glu Arg Ser Arg Val Asp Ser Lys Leu Thr
 210 215 220
 Asp Asn Ser Leu Tyr His Phe Cys Val Phe Ser Asp Asn Ile Ile Ala
 225 230 235 240
 Thr Ser Val Val Val Asn Ser Thr Ala Leu Asn Ser Lys Ala Pro Glu
 245 250 255
 Lys Val Val Phe His Leu Val Thr Asn Glu Ile Asn Tyr Ala Ala Met
 260 265 270
 Lys Ala Trp Phe Ala Ile Asn Met Asp Asn Leu Arg Gly Val Thr Val
 275 280 285
 Glu Val Gln Lys Phe Glu Asp Phe Ser Trp Leu Asn Ala Ser Tyr Val
 290 295 300
 Pro Val Leu Lys Gln Leu Gln Asp Ser Asp Thr Gln Ser Tyr Tyr Phe
 305 310 315 320
 Ser Gly His Asn Asp Asp Gly Arg Thr Pro Ile Lys Phe Arg Asn Pro
 325 330 335
 Lys Tyr Leu Ser Met Leu Asn His Leu Arg Phe Tyr Ile Pro Glu Val
 340 345 350

14-03 WO.sequence listing.txt

Phe Pro Ala Leu Lys Lys Val Val Phe Leu Asp Asp Asp Val Val Val
 355 360 365

Gln Lys Asp Leu Ser Ser Leu Phe Ser Ile Asp Leu Asn Lys Asn Val
 370 375 380

Asn Gly Ala Val Glu Thr Cys Met Glu Thr Phe His Arg Tyr His Lys
 385 390 400

Tyr Leu Asn Tyr Ser His Pro Leu Ile Arg Ser His Phe Asp Pro Asp
 405 410 415

Ala Cys Gly Trp Ala Phe Gly Met Asn Val Phe Asp Leu Val Glu Trp
 420 425 430

Arg Lys Arg Asn Val Thr Gly Ile Tyr His Tyr Trp Gln Glu Lys Asn
 435 440 445

Val Asp Arg Thr Leu Trp Lys Leu Gly Thr Leu Pro Pro Gly Leu Leu
 450 455 460

Thr Phe Tyr Gly Leu Thr Glu Ala Leu Glu Ala Ser Trp His Ile Leu
 465 470 475 480

Gly Leu Gly Tyr Thr Asn Val Asp Ala Arg Val Ile Glu Lys Gly Ala
 485 490 495

Val Leu His Phe Asn Gly Asn Leu Lys Pro Trp Leu Lys Ile Gly Ile
 500 505 510

Glu Lys Tyr Lys Pro Leu Trp Glu Arg Tyr Val Asp Tyr Thr Ser Pro
 515 520 525

Phe Met Gln Gln Cys Asn Phe His
 530 535

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<211> 1833

<212> DNA

<213> Arabidopsis thaliana

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gaattcattg aagaattatc cgacattaca gataagaccg aggatgaact tagacttact 180

gctattgaac aggacgaaga aggcttgaag gagcctaaac gtattctgca ggatcgagat 240

14-03 WO.sequence listing.txt

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<210> 14
 <211> 610
 <212> PRT
 <213> Arabidopsis thaliana

<400> 14

Met Asn Gln Val Arg Arg Trp Gln Arg Ile Leu Ile Leu Ser Leu Leu
 Page 23

14-03 WO.sequence listing.txt

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35      40      45
Ile Thr Asp Lys Thr Glu Asp Glu Leu Arg Leu Thr Ala Ile Glu Gln
50      55      60
Asp Glu Glu Gly Leu Lys Glu Pro Lys Arg Ile Leu Gln Asp Arg Asp
65      70      75      80
Phe Asn Ser Val Val Leu Ser Asn Ser Ser Asp Lys Ser Asn Asp Thr
85      90      95
Val Gln Ser Asn Glu Gly Asp Gln Lys Asn Phe Leu Ser Glu Val Asp
100     105     110
Lys Gly Asn Asn His Lys Pro Lys Glu Glu Gln Ala Val Ser Gln Lys
115     120     125
Thr Thr Val Ser Ser Asn Ala Glu Val Lys Ile Ser Ala Arg Asp Ile
130     135     140
Gln Leu Asn His Lys Thr Glu Phe Arg Pro Pro Ser Ser Lys Ser Glu
145     150     155     160
Lys Asn Thr Arg Val Gln Leu Glu Arg Ala Thr Asp Glu Arg Val Lys
165     170     175
Glu Ile Arg Asp Lys Ile Ile Gln Ala Lys Ala Tyr Leu Asn Leu Ala
180     185     190
Leu Pro Gly Asn Asn Ser Gln Ile Val Lys Glu Leu Arg Val Arg Thr
195     200     205
Lys Glu Leu Glu Arg Ala Thr Gly Asp Thr Thr Lys Asp Lys Tyr Leu
210     215     220
Pro Lys Ser Ser Pro Asn Arg Leu Lys Ala Met Glu Val Ala Leu Tyr
225     230     235     240
Lys Val Ser Arg Ala Phe His Asn Cys Pro Ala Ile Ala Thr Lys Leu
245     250     255

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14-03 WO.sequence listing.txt

Gln Ala Met Thr Tyr Lys Thr Glu Glu Gln Ala Arg Ala Gln Lys Lys
 260 265 270

Gln Ala Ala Tyr Leu Met Gln Leu Ala Ala Arg Thr Thr Pro Lys Gly
 275 280 285

Leu His Cys Leu Ser Met Arg Leu Thr Thr Glu Tyr Phe Thr Leu Asp
 290 295 300

His Glu Lys Arg Gln Leu Leu Gln Gln Ser Tyr Asn Asp Pro Asp Leu
 305 310 315 320

Tyr His Tyr Val Val Phe Ser Asp Asn Val Leu Ala Ser Ser Val Val
 325 330 335

Val Asn Ser Thr Ile Ser Ser Ser Lys Glu Pro Asp Lys Ile Val Phe
 340 345 350

His Val Val Thr Asp Ser Leu Asn Tyr Pro Ala Ile Ser Met Trp Phe
 355 360 365

Leu Leu Asn Pro Ser Gly Arg Ala Ser Ile Gln Ile Leu Asn Ile Asp
 370 375 380

Glu Met Asn Val Leu Pro Leu Tyr His Ala Glu Leu Leu Met Lys Gln
 385 390 395 400

Asn Ser Ser Asp Pro Arg Ile Ile Ser Ala Leu Asn His Ala Arg Phe
 405 410 415

Tyr Leu Pro Asp Ile Phe Pro Gly Leu Asn Lys Ile Val Leu Phe Asp
 420 425 430

His Asp Val Val Val Gln Arg Asp Leu Thr Arg Leu Trp Ser Leu Asp
 435 440 445

Met Thr Gly Lys Val Val Gly Ala Val Glu Thr Cys Leu Glu Gly Asp
 450 455 460

Pro Ser Tyr Arg Ser Met Asp Ser Phe Ile Asn Phe Ser Asp Ala Trp
 465 470 475 480

Val Ser Gln Lys Phe Asp Pro Lys Ala Cys Thr Trp Ala Phe Gly Met
 485 490 495

Asn Leu Phe Asp Leu Glu Glu Trp Arg Arg Gln Glu Leu Thr Ser Val
 500 505 510

14-03 WO.sequence listing.txt

Tyr Leu Lys Tyr Phe Asp Leu Gly Val Lys Gly His Leu Trp Lys Ala
 515 520 525

Gly Gly Leu Pro Val Gly Trp Leu Thr Phe Phe Gly Gln Thr Phe Pro
 530 535 540

Leu Glu Lys Arg Trp Asn Val Gly Gly Leu Gly His Glu Ser Gly Leu
 545 550 555 560

Arg Ala Ser Asp Ile Glu Gln Ala Ala Val Ile His Tyr Asp Gly Ile
 565 570 575

Met Lys Pro Trp Leu Asp Ile Gly Ile Asp Lys Tyr Lys Arg Tyr Trp
 580 585 590

Asn Ile His Val Pro Tyr His His Pro His Leu Gln Arg Cys Asn Ile
 595 600 605

His Asp
 610

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 <211> 1587
 <212> DNA
 <213> Arabidopsis thaliana

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 gcttccaagg cactaccaga tgctatccac tgcttgacca tgcgcttgaa tctagagtat 660
 catctcctgc ctttaccgat gagaaaattt ccaaggaggg agaatttgga gaatccaaaa 720
 ctttaccact acgctctctt ctctgataat gtactggctg catcagttgt tgtcaactcc 780
 acagtcatga atgcacagga tccttcaagg catgttttcc accttgtgac tgataagctc 840

14-03 WO.sequence listing.txt

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gaaaactttg atcccaagtt ctgcggatgg gcttatggga tgaacatctt cgacctgaaa 1260
gaatggaaga agaacaacat tacagaaact tatcactttt ggcaaaacct gaacgaaaac 1320
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caaccacttc agagaaaatg gcacttactt ggactggggtt atgataaagg aatcgatgtc 1440
aagaagattg aaagatcagc tggtatacat tacaatggac acatgaaacc atggacagag 1500
atggggataa gcaagtatca gccatattgg acgaagtaca ccaattttga ccaccttac 1560
atctttactt gcaggctggt tgagtga 1587

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<210> 16

<211> 528

<212> PRT

<213> Arabidopsis thaliana

<400> 16

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20 25 30

Glu Met Leu His Glu Arg Ser Leu Arg Gln Glu Lys Arg Leu Glu Arg
35 40 45

Ala Asn Glu Leu Met Asn Asp Asp Ser Leu Gln Lys Leu Glu Thr Ala
50 55 60

Ala Met Ala Arg Ser Arg Ser Val Asp Ser Ala Pro Leu Gly Asn Tyr
65 70 75 80

Thr Ile Trp Lys Asn Glu Tyr Arg Arg Gly Lys Ser Phe Glu Asp Met
85 90 95

Leu Arg Leu Met Gln Asp Gln Ile Ile Met Ala Arg Val Tyr Ser Gly
100 105 110

Leu Ala Lys Phe Thr Asn Asn Leu Ala Leu His Gln Glu Ile Glu Thr

115

14-03 WO.sequence listing.txt
120 125

Gln Leu Met Lys Leu Ala Trp Glu Glu Glu Ser Thr Asp Ile Asp Gln
 130 135 140
 Glu Gln Arg Val Leu Asp Ser Ile Arg Asp Met Gly Gln Ile Leu Ala
 145 150 155 160
 Arg Ala His Glu Gln Leu Tyr Glu Cys Lys Leu Val Thr Asn Lys Leu
 165 170 175
 Arg Ala Met Leu Gln Thr Val Glu Asp Glu Leu Glu Asn Glu Gln Thr
 180 185 190
 Tyr Ile Thr Phe Leu Thr Gln Leu Ala Ser Lys Ala Leu Pro Asp Ala
 195 200 205
 Ile His Cys Leu Thr Met Arg Leu Asn Leu Glu Tyr His Leu Leu Pro
 210 215 220
 Leu Pro Met Arg Asn Phe Pro Arg Arg Glu Asn Leu Glu Asn Pro Lys
 225 230 235 240
 Leu Tyr His Tyr Ala Leu Phe Ser Asp Asn Val Leu Ala Ala Ser Val
 245 250 255
 Val Val Asn Ser Thr Val Met Asn Ala Gln Asp Pro Ser Arg His Val
 260 265 270
 Phe His Leu Val Thr Asp Lys Leu Asn Phe Gly Ala Met Ser Met Trp
 275 280 285
 Phe Leu Leu Asn Pro Pro Gly Glu Ala Thr Ile His Val Gln Arg Phe
 290 295 300
 Glu Asp Phe Thr Trp Leu Asn Ser Ser Tyr Ser Pro Val Leu Ser Gln
 305 310 315 320
 Leu Glu Ser Ala Ala Met Lys Lys Phe Tyr Phe Lys Thr Ala Arg Ser
 325 330 335
 Glu Ser Val Glu Ser Gly Ser Glu Asn Leu Lys Tyr Arg Tyr Pro Lys
 340 345 350
 Tyr Met Ser Met Leu Asn His Leu Arg Phe Tyr Ile Pro Arg Ile Phe
 355 360 365

14-03 WO.sequence listing.txt

Pro Lys Leu Glu Lys Ile Leu Phe Val Asp Asp Asp Val Val Val Gln
 370 375 380

Lys Asp Leu Thr Pro Leu Trp Ser Ile Asp Leu Lys Gly Lys Val Asn
 385 390 395 400

Glu Asn Phe Asp Pro Lys Phe Cys Gly Trp Ala Tyr Gly Met Asn Ile
 405 410 415

Phe Asp Leu Lys Glu Trp Lys Lys Asn Asn Ile Thr Glu Thr Tyr His
 420 425 430

Phe Trp Gln Asn Leu Asn Glu Asn Arg Thr Leu Trp Lys Leu Gly Thr
 435 440 445

Leu Pro Pro Gly Leu Ile Thr Phe Tyr Asn Leu Thr Gln Pro Leu Gln
 450 455 460

Arg Lys Trp His Leu Leu Gly Leu Gly Tyr Asp Lys Gly Ile Asp Val
 465 470 475 480

Lys Lys Ile Glu Arg Ser Ala Val Ile His Tyr Asn Gly His Met Lys
 485 490 495

Pro Trp Thr Glu Met Gly Ile Ser Lys Tyr Gln Pro Tyr Trp Thr Lys
 500 505 510

Tyr Thr Asn Phe Asp His Pro Tyr Ile Phe Thr Cys Arg Leu Phe Glu
 515 520 525

<210> 17

<211> 1602

<212> DNA

<213> Arabidopsis thaliana

<400> 17

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actatcttaa tcctcgcttt cttgttacct tttgttttca tcctaaccgc tgttggtacc 180

cttgaagggtg tcaacaagtg ctctctttt gattgtttcg ggaggcggct aggaccacgt 240

cttcttggtg ggatagatga ttcagagcag agactagtta gagattttta caaaattcta 300

aatgaagtaa gcaactcaaga aattccagat gggttaaagc ttccagagtc ttttagtcaa 360

ctggtttcgg atatgaagaa caaccactat gatgctaaaa catttgccct cgtatttcga 420

gctatggtag agaagtttga aagggattta agggaatcca aatttgcaga actcatgaac 480

aagcactttg ctgcaagttc aattccaaaa ggaattcact gtctctcttt aagactaacc 540

14-03 WO.sequence listing.txt

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gctcctgcga ttgttgaagt gaaaagcgtt catcagtttg attggttaac aagagagaaat 840
gttccagttc ttgaagctgt ggaaagccat aacagtatca gaaattatta ccatgggaat 900
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aagccgtggc ttgagatagg tttcgagcat ctcagaccat tctggacaaa atatgttaac 1560
tactccaatg atttcattaa gaattgtcat atcttggaaat ag 1602

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<210> 18
 <211> 533
 <212> PRT
 <213> Arabidopsis thaliana

<400> 18

Met Gln Leu His Ile Ser Pro Ser Met Arg Ser Ile Thr Ile Ser Ser
 1 5 10 15

Ser Asn Glu Phe Ile Asp Leu Met Lys Ile Lys Val Ala Ala Arg His
 20 25 30

Ile Ser Tyr Arg Thr Leu Phe His Thr Ile Leu Ile Leu Ala Phe Leu
 35 40 45

Leu Pro Phe Val Phe Ile Leu Thr Ala Val Val Thr Leu Glu Gly Val
 50 55 60

Asn Lys Cys Ser Ser Phe Asp Cys Phe Gly Arg Arg Leu Gly Pro Arg
 65 70 75 80

14-03 WO.sequence listing.txt

Leu Leu Gly Arg Ile Asp Asp Ser Glu Gln Arg Leu Val Arg Asp Phe
 85 90 95
 Tyr Lys Ile Leu Asn Glu Val Ser Thr Gln Glu Ile Pro Asp Gly Leu
 100 105 110
 Lys Leu Pro Glu Ser Phe Ser Gln Leu Val Ser Asp Met Lys Asn Asn
 115 120 125
 His Tyr Asp Ala Lys Thr Phe Ala Leu Val Phe Arg Ala Met Val Glu
 130 135 140
 Lys Phe Glu Arg Asp Leu Arg Glu Ser Lys Phe Ala Glu Leu Met Asn
 145 150 155 160
 Lys His Phe Ala Ala Ser Ser Ile Pro Lys Gly Ile His Cys Leu Ser
 165 170
 Leu Arg Leu Thr Asp Glu Tyr Ser Ser Asn Ala His Ala Arg Arg Gln
 180 185 190
 Leu Pro Ser Pro Glu Leu Leu Pro Val Leu Ser Asp Asn Ala Tyr His
 195 200 205
 His Phe Val Leu Ala Thr Asp Asn Ile Leu Ala Ala Ser Val Val Val
 210 215 220
 Ser Ser Ala Val Gln Ser Ser Ser Lys Pro Glu Lys Ile Val Phe His
 225 230 235 240
 Val Ile Thr Asp Lys Lys Thr Tyr Ala Gly Met His Ser Trp Phe Ala
 245 250 255
 Leu Asn Ser Val Ala Pro Ala Ile Val Glu Val Lys Ser Val His Gln
 260 265 270
 Phe Asp Trp Leu Thr Arg Glu Asn Val Pro Val Leu Glu Ala Val Glu
 275 280 285
 Ser His Asn Ser Ile Arg Asn Tyr Tyr His Gly Asn His Ile Ala Gly
 290 295 300
 Ala Asn Leu Ser Glu Thr Thr Pro Arg Thr Phe Ala Ser Lys Leu Gln
 305 310 315 320
 Ser Arg Ser Pro Lys Tyr Ile Ser Leu Leu Asn His Leu Arg Ile Tyr
 Page 31

14-03 WO.sequence listing.txt

325

330

335

Leu Pro Glu Leu Phe Pro Asn Leu Asp Lys Val Val Phe Leu Asp Asp
 340 345 350

Asp Ile Val Ile Gln Lys Asp Leu Ser Pro Leu Trp Asp Ile Asp Leu
 355 360 365

Asn Gly Lys Val Asn Gly Ala Val Glu Thr Cys Arg Gly Glu Asp Val
 370 375 380

Trp Val Met Ser Lys Arg Leu Arg Asn Tyr Phe Asn Phe Ser His Pro
 385 390 395 400

Leu Ile Ala Lys His Leu Asp Pro Glu Glu Cys Ala Trp Ala Tyr Gly
 405 410 415

Met Asn Ile Phe Asp Leu Arg Thr Trp Arg Lys Thr Asn Ile Arg Glu
 420 425 430

Thr Tyr His Ser Trp Leu Lys Glu Asn Leu Lys Ser Asn Leu Thr Met
 435 440 445

Trp Lys Leu Gly Thr Leu Pro Pro Ala Leu Ile Ala Phe Lys Gly His
 450 455 460

Val Gln Pro Ile Asp Ser Ser Trp His Met Leu Gly Leu Gly Tyr Gln
 465 470 475 480

Ser Lys Thr Asn Leu Glu Asn Ala Lys Lys Ala Ala Val Ile His Tyr
 485 490 495

Asn Gly Gln Ser Lys Pro Trp Leu Glu Ile Gly Phe Glu His Leu Arg
 500 505 510

Pro Phe Trp Thr Lys Tyr Val Asn Tyr Ser Asn Asp Phe Ile Lys Asn
 515 520 525

Cys His Ile Leu Glu
 530

<210> 19

<211> 1686

<212> DNA

<213> Arabidopsis thaliana

<400> 19

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14-03 WO.sequence listing.txt

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tctctctgga ctaaatatgt tgataacgaa atggagtttg tgcagatgtg caattttggt 1680
ctctaa 1686

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<210> 20

<211> 561

<212> PRT

<213> Arabidopsis thaliana

<400> 20

14-03 WO.sequence listing.txt

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 1 5 10 15
 Ser Thr Gly Leu Arg Ser Phe Phe Ser Tyr Arg Ile Phe Ile Ser Ala
 20 25 30
 Leu Phe Ser Phe Leu Phe Leu Ala Thr Phe Ser Val Val Leu Asn Ser
 35 40 45
 Ser Arg His Gln Pro His Gln Asp His Thr Leu Pro Ser Met Gly Asn
 50 55 60
 Ala Tyr Met Gln Arg Thr Phe Leu Ala Leu Gln Ser Asp Pro Leu Lys
 65 70 75 80
 Thr Arg Leu Asp Leu Ile His Lys Gln Ala Ile Asp His Leu Thr Leu
 85 90 95
 Val Asn Ala Tyr Ala Ala Tyr Ala Arg Lys Leu Lys Leu Asp Ala Ser
 100 105 110
 Lys Gln Leu Lys Leu Phe Glu Asp Leu Ala Ile Asn Phe Ser Asp Leu
 115 120 125
 Gln Ser Lys Pro Gly Leu Lys Ser Ala Val Ser Asp Asn Gly Asn Ala
 130 135 140
 Leu Glu Glu Asp Ser Phe Arg Gln Leu Glu Lys Glu Val Lys Asp Lys
 145 150 155 160
 Val Lys Thr Ala Arg Met Met Ile Val Glu Ser Lys Glu Ser Tyr Asp
 165 170 175
 Thr Gln Leu Lys Ile Gln Lys Leu Lys Asp Thr Ile Phe Ala Val Gln
 180 185 190
 Glu Gln Leu Thr Lys Ala Lys Lys Asn Gly Ala Val Ala Ser Leu Ile
 195 200 205
 Ser Ala Lys Ser Val Pro Lys Ser Leu His Cys Leu Ala Met Arg Leu
 210 215 220
 Val Gly Glu Arg Ile Ser Asn Pro Glu Lys Tyr Lys Asp Ala Pro Pro
 225 230 235 240
 Asp Pro Ala Ala Glu Asp Pro Thr Leu Tyr His Tyr Ala Ile Phe Ser
 245 250 255

14-03 WO.sequence listing.txt

Asp Asn Val Ile Ala Val Ser Val Val Val Arg Ser Val Val Met Asn
 260 265 270
 Ala Glu Glu Pro Trp Lys His Val Phe His Val Val Thr Asp Arg Met
 275 280 285
 Asn Leu Ala Ala Met Lys Val Trp Phe Lys Met Arg Pro Leu Asp Arg
 290 295 300
 Gly Ala His Val Glu Ile Lys Ser Val Glu Asp Phe Lys Phe Leu Asn
 305 310 315 320
 Ser Ser Tyr Ala Pro Val Leu Arg Gln Leu Glu Ser Ala Lys Leu Gln
 325 330 335
 Lys Phe Tyr Phe Glu Asn Gln Ala Glu Asn Ala Thr Lys Asp Ser His
 340 345 350
 Asn Leu Lys Phe Lys Asn Pro Lys Tyr Leu Ser Met Leu Asn His Leu
 355 360 365
 Arg Phe Tyr Leu Pro Glu Met Tyr Pro Lys Leu Asn Lys Ile Leu Phe
 370 375 380
 Leu Asp Asp Asp Val Val Val Gln Lys Asp Val Thr Gly Leu Trp Lys
 385 390 395 400
 Ile Asn Leu Asp Gly Lys Val Asn Gly Ala Val Glu Thr Cys Phe Gly
 405 410 415
 Ser Phe His Arg Tyr Gly Gln Tyr Leu Asn Phe Ser His Pro Leu Ile
 420 425 430
 Lys Glu Asn Phe Asn Pro Ser Ala Cys Ala Trp Ala Phe Gly Met Asn
 435 440 445
 Ile Phe Asp Leu Asn Ala Trp Arg Arg Glu Lys Cys Thr Asp Gln Tyr
 450 455 460
 His Tyr Trp Gln Asn Leu Asn Glu Asp Arg Thr Leu Trp Lys Leu Gly
 465 470 475 480
 Thr Leu Pro Pro Gly Leu Ile Thr Phe Tyr Ser Lys Thr Lys Ser Leu
 485 490 495
 Asp Lys Ser Trp His Val Leu Gly Leu Gly Tyr Asn Pro Gly Val Ser

14-03 WO.sequence listing.txt

500

505

510

Met Asp Glu Ile Arg Asn Ala Gly Val Ile His Tyr Asn Gly Asn Met
 515 520 525

Lys Pro Trp Leu Asp Ile Ala Met Asn Gln Tyr Lys Ser Leu Trp Thr
 530 535 540

Lys Tyr Val Asp Asn Glu Met Glu Phe Val Gln Met Cys Asn Phe Gly
 545 550 555 560

Leu

<210> 21
 <211> 1680
 <212> DNA
 <213> Arabidopsis thaliana

<400> 21
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 actcgtcaag tgattgctga agctaaagag tcttttgata atcagttgaa gattcagaag 540
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 ctgatggaag agaggattgc tcaccctgag aagtatactg atgaagggaa agatagaccg 720
 cgggagctcg aggatccgaa tctttaccat tacgctatat tttcggataa tgtgattgcg 780
 gcttcggtgg ttgtgaactc tgctgtgaag aatgctaagg agccgtggaa gcatgttttt 840
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 tataaaggag ctcatgtaga agttaaaagct gttgaggatt atacgttttt gaactcttcg 960
 tatgtgcctg tggtgaagca gttagaatct gcgaatcttc agaagtttta tttcgagaat 1020
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14-03 WO.sequence listing.txt

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gaatatcact actggcaaaa tctgaacgag aacagggctc tatggaaact ggggacgtta 1440
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cacttcaacg gtaacatgaa gccatggctt gacatagcta tgaaccagtt tcgaccactt 1620
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<210> 22
 <211> 559
 <212> PRT
 <213> Arabidopsis thaliana

<400> 22

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Ile Gly Gly Arg Ile Thr Leu Thr Ala Phe Ala Ser Thr Ile Ala Leu
 20 25 30

Phe Leu Phe Thr Leu Ser Phe Phe Phe Ala Ser Asp Ser Asn Asp Ser
 35 40 45

Pro Asp Leu Leu Leu Pro Gly Val Glu Tyr Ser Asn Gly Val Gly Ser
 50 55 60

Arg Arg Ser Met Leu Asp Ile Lys Ser Asp Pro Leu Lys Pro Arg Leu
 65 70 75 80

Ile Gln Ile Arg Lys Gln Ala Asp Asp His Arg Ser Leu Ala Leu Ala
 85 90 95

Tyr Ala Ser Tyr Ala Arg Lys Leu Lys Leu Glu Asn Ser Lys Leu Val
 100 105 110

Arg Ile Phe Ala Asp Leu Ser Arg Asn Tyr Thr Asp Leu Ile Asn Lys
 115 120 125

Pro Thr Tyr Arg Ala Leu Tyr Asp Ser Asp Gly Ala Ser Ile Glu Glu
 130 135 140

Ser Val Leu Arg Gln Phe Glu Lys Glu Val Lys Glu Arg Ile Lys Met
 Page 37

14-03 WO.sequence listing.txt

145 150 155 160
 Thr Arg Gln Val Ile Ala Glu Ala Lys Glu Ser Phe Asp Asn Gln Leu
 165 170 175
 Lys Ile Gln Lys Leu Lys Asp Thr Ile Phe Ala Val Asn Glu Gln Leu
 180 185 190
 Thr Asn Ala Lys Lys Gln Gly Ala Phe Ser Ser Leu Ile Ala Ala Lys
 195 200 205
 Ser Ile Pro Lys Gly Leu His Cys Leu Ala Met Arg Leu Met Glu Glu
 210 215 220
 Arg Ile Ala His Pro Glu Lys Tyr Thr Asp Glu Gly Lys Asp Arg Pro
 225 230 235 240
 Arg Glu Leu Glu Asp Pro Asn Leu Tyr His Tyr Ala Ile Phe Ser Asp
 245 250 255
 Asn Val Ile Ala Ala Ser Val Val Val Asn Ser Ala Val Lys Asn Ala
 260 265 270
 Lys Glu Pro Trp Lys His Val Phe His Val Val Thr Asp Lys Met Asn
 275 280 285
 Leu Gly Ala Met Gln Val Met Phe Lys Leu Lys Glu Tyr Lys Gly Ala
 290 295 300
 His Val Glu Val Lys Ala Val Glu Asp Tyr Thr Phe Leu Asn Ser Ser
 305 310 315 320
 Tyr Val Pro Val Leu Lys Gln Leu Glu Ser Ala Asn Leu Gln Lys Phe
 325 330 335
 Tyr Phe Glu Asn Lys Leu Glu Asn Ala Thr Lys Asp Thr Thr Asn Met
 340 345 350
 Lys Phe Arg Asn Pro Lys Tyr Leu Ser Ile Leu Asn His Leu Arg Phe
 355 360 365
 Tyr Leu Pro Glu Met Tyr Pro Lys Leu His Arg Ile Leu Phe Leu Asp
 370 375 380
 Asp Asp Val Val Val Gln Lys Asp Leu Thr Gly Leu Trp Glu Ile Asp
 385 390 395 400

14-03 WO.sequence listing.txt

Met Asp Gly Lys Val Asn Gly Ala Val Glu Thr Cys Phe Gly Ser Phe
 405 410 415

His Arg Tyr Ala Gln Tyr Met Asn Phe Ser His Pro Leu Ile Lys Glu
 420 425 430

Lys Phe Asn Pro Lys Ala Cys Ala Trp Ala Tyr Gly Met Asn Phe Phe
 435 440 445

Asp Leu Asp Ala Trp Arg Arg Glu Lys Cys Thr Glu Glu Tyr His Tyr
 450 455 460

Trp Gln Asn Leu Asn Glu Asn Arg Ala Leu Trp Lys Leu Gly Thr Leu
 465 470 475 480

Pro Pro Gly Leu Ile Thr Phe Tyr Ser Thr Thr Lys Pro Leu Asp Lys
 485 490 495

Ser Trp His Val Leu Gly Leu Gly Tyr Asn Pro Ser Ile Ser Met Asp
 500 505 510

Glu Ile Arg Asn Ala Ala Val Val His Phe Asn Gly Asn Met Lys Pro
 515 520 525

Trp Leu Asp Ile Ala Met Asn Gln Phe Arg Pro Leu Trp Thr Lys His
 530 535 540

Val Asp Tyr Asp Leu Glu Phe Val Gln Ala Cys Asn Phe Gly Leu
 545 550 555

<210> 23
 <211> 1623
 <212> DNA
 <213> Arabidopsis thaliana

<400> 23
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 ggatcattgg agtcattcga cgaccttggt aaggagatga cgtaaaacg ccgtgacata 420
 agggcgtttg cttccgtgac taagaagatg ctgttgacaga tggaacgtaa agtccaatca 480
 gcgaaacatc atgagttagt gtactggcat ttagcctctc acggtattcc taaaagcctc 540

14-03 WO.sequence listing.txt

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cattgccttt ccctcagatt aactgaagag tactctgtaa atgcaatggc tcgaatgcgt    600
ttgcctccgc ctgagtcctg atcacgtctg accgacccat cttttcatca tattgtcctc    660
ctgactgaca atgtccttgc tgcctctgtc gtcatatcgt ctactgtaca aaacgctgtg    720
aatcccgaga agtttgtctt tcatattggt accgataaga aaacctatac ccctatgcat    780
gcttggtttg ctatcaactc tgcttcatca ccagttgttg aagtaaaggg acttcatcag    840
tatgattggc ctcaagaagt gaacttcaaa gttagagaga tgctggacat tcaccgctta    900
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catgagcagt ccttgcaagc tctaaatcct agctgccttg cccttttgaa ccctcttcgc   1020
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gtagtacaga gcgatctttc gtctttatgg gaaacggatc tcaacggtaa agttgttggt   1140
gctgtcgttg attcgtggtg cggagacaac tgttgccccg gaagaaaata caaagactat   1200
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ttacatttca gcggtcagc aaaaccgtgg ctagagatca gtaaccctga ggtacgatct   1560
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tga                                                                    1623

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<210> 24
<211> 540
<212> PRT
<213> Arabidopsis thaliana
<400> 24

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Asn Pro Gly Val Gly Ile Gly Lys Gly Ser Gly Gly Cys Ala Ala Ala
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Ala Ala Ala Leu Ala Ala Arg Arg Phe Ser Ser Arg Thr Leu Leu Leu
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Leu Leu Leu Leu Leu Ala Ile Val Leu Pro Phe Ile Phe Val Arg Phe
 50          55          60

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14-03 wo.sequence listing.txt

Ala Phe Leu Val Leu Glu Ser Ala Ser Val Cys Asp Ser Pro Leu Asp
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 Cys Met Gly Leu Arg Leu Phe Arg Gly Gly Asp Thr Ser Leu Lys Ile
 85 90 95
 Gly Glu Glu Leu Thr Arg Ala Leu Val Glu Glu Thr Thr Asp His Gln
 100 105 110
 Asp Val Asn Gly Arg Gly Thr Lys Gly Ser Leu Glu Ser Phe Asp Asp
 115 120 125
 Leu Val Lys Glu Met Thr Leu Lys Arg Arg Asp Ile Arg Ala Phe Ala
 130 135 140
 Ser Val Thr Lys Lys Met Leu Leu Gln Met Glu Arg Lys Val Gln Ser
 145 150 155 160
 Ala Lys His His Glu Leu Val Tyr Trp His Leu Ala Ser His Gly Ile
 165 170 175
 Pro Lys Ser Leu His Cys Leu Ser Leu Arg Leu Thr Glu Glu Tyr Ser
 180 185 190
 Val Asn Ala Met Ala Arg Met Arg Leu Pro Pro Pro Glu Ser Val Ser
 195 200 205
 Arg Leu Thr Asp Pro Ser Phe His His Ile Val Leu Leu Thr Asp Asn
 210 215 220
 Val Leu Ala Ala Ser Val Val Ile Ser Ser Thr Val Gln Asn Ala Val
 225 230 235 240
 Asn Pro Glu Lys Phe Val Phe His Ile Val Thr Asp Lys Lys Thr Tyr
 245 250 255
 Thr Pro Met His Ala Trp Phe Ala Ile Asn Ser Ala Ser Ser Pro Val
 260 265 270
 Val Glu Val Lys Gly Leu His Gln Tyr Asp Trp Pro Gln Glu Val Asn
 275 280 285
 Phe Lys Val Arg Glu Met Leu Asp Ile His Arg Leu Ile Trp Arg Arg
 290 295 300
 His Tyr Gln Asn Leu Lys Asp Ser Asp Phe Ser Phe Val Glu Gly Thr
 305 310 315 320

14-03 WO.sequence listing.txt

His Glu Gln Ser Leu Gln Ala Leu Asn Pro Ser Cys Leu Ala Leu Leu
 325 330 335
 Asn His Leu Arg Ile Tyr Ile Pro Lys Leu Phe Pro Asp Leu Asn Lys
 340 345 350
 Ile Val Leu Leu Asp Asp Asp Val Val Val Gln Ser Asp Leu Ser Ser
 355 360 365
 Leu Trp Glu Thr Asp Leu Asn Gly Lys Val Val Gly Ala Val Val Asp
 370 375 380
 Ser Trp Cys Gly Asp Asn Cys Cys Pro Gly Arg Lys Tyr Lys Asp Tyr
 385 390 395 400
 Phe Asn Phe Ser His Pro Leu Ile Ser Ser Asn Leu Val Gln Glu Asp
 405 410 415
 Cys Ala Trp Leu Ser Gly Met Asn Val Phe Asp Leu Lys Ala Trp Arg
 420 425 430
 Gln Thr Asn Ile Thr Glu Ala Tyr Ser Thr Trp Leu Arg Leu Ser Val
 435 440 445
 Arg Ser Gly Leu Gln Leu Trp Gln Pro Gly Ala Leu Pro Pro Thr Leu
 450 455 460
 Leu Ala Phe Lys Gly Leu Thr Gln Ser Leu Glu Pro Ser Trp His Val
 465 470 475 480
 Ala Gly Leu Gly Ser Arg Ser Val Lys Ser Pro Gln Glu Ile Leu Lys
 485 490 495
 Ser Ala Ser Val Leu His Phe Ser Gly Pro Ala Lys Pro Trp Leu Glu
 500 505 510
 Ile Ser Asn Pro Glu Val Arg Ser Leu Trp Tyr Arg Tyr Val Asn Ser
 515 520 525
 Ser Asp Ile Phe Val Arg Lys Cys Lys Ile Met Asn
 530 535 540

<210> 25
 <211> 2043
 <212> DNA
 <213> Arabidopsis thaliana
 <400> 25

14-03 WO.sequence listing.txt

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ccgctgcaag ataataatct acaggagggtg tatgcttcct cagctgctgc agtgactac	180
gatccagatc tgaaagatgt gaacatagtt gcgacataca gtgaccatta cggcaatata	240
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aatgatactg gaatggaaga taatgcaagc cattctacaa ctaatcagac tgatgaaagc	420
gaaaatcagt ttccaaacgt ggattttgca agcccagcaa aactgaagcg gcagatttta	480
cgtcaggaaa ggagagggtca acgaacttta gagctgatcc gacaagaaaa ggaaactgat	540
gagcagatgc aagaagcagc cattcagaag tcaatgagct ttgaaaactc agtcataggg	600
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accaatctgt acgttttctt gatgcagcag tgtggagaaa ataaacgtgt tataggtaaa	780
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gccatccttc agtccactga acgcaaagta gatggactga agaaaaaggg aaccttctta	960
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gcagactatt ttattctagg tttcaatgaa gaggatgcag tgaaagagga tgtcagtcaa	1080
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catatagtaa ctgacaaact gaattttggt gcaatgaaga tgtgggtttcg catcaatgct	1260
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gggatatatc actattggca agacttgaat gaagacagaa cactgtggaa gctgggatcg	1800
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gtactagggc tgggatatga cccagcgcta aaccaaacag caatagagaa tgcagcggtg	1920

14-03 WO.sequence listing.txt

gtgcattaca atgggaacta caagccatgg ctgggttttag cattcgccaa gtacaaaccg 1980
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 tga 2043

<210> 26
 <211> 680
 <212> PRT
 <213> Arabidopsis thaliana

<400> 26

Met Thr Thr Phe Ser Thr Cys Ala Ala Phe Leu Ser Leu Val Val Val
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Leu His Ala Val His Val Gly Gly Ala Ile Leu Glu Ser Gln Ala Pro
 20 25 30

His Arg Glu Leu Lys Ala Tyr Arg Pro Leu Gln Asp Asn Asn Leu Gln
 35 40 45

Glu Val Tyr Ala Ser Ser Ala Ala Ala Val His Tyr Asp Pro Asp Leu
 50 55 60

Lys Asp Val Asn Ile Val Ala Thr Tyr Ser Asp His Tyr Gly Asn Ile
 65 70 75 80

Arg Leu Gly Arg Val Lys Met Gly Asp Leu Ser Pro Ser Trp Val Leu
 85 90 95

Glu Asn Pro Ala Tyr Gln Val Ser Arg Lys Thr Lys Gly Ser Gln Leu
 100 105 110

Val Ile Pro Arg Asp Ser Phe Gln Asn Asp Thr Gly Met Glu Asp Asn
 115 120 125

Ala Ser His Ser Thr Thr Asn Gln Thr Asp Glu Ser Glu Asn Gln Phe
 130 135 140

Pro Asn Val Asp Phe Ala Ser Pro Ala Lys Leu Lys Arg Gln Ile Leu
 145 150 155 160

Arg Gln Glu Arg Arg Gly Gln Arg Thr Leu Glu Leu Ile Arg Gln Glu
 165 170 175

Lys Glu Thr Asp Glu Gln Met Gln Glu Ala Ala Ile Gln Lys Ser Met
 180 185 190

14-03 WO.sequence listing.txt

Ser Phe Glu Asn Ser Val Ile Gly Lys Tyr Ser Ile Trp Arg Arg Asp
 195 200 205
 Tyr Glu Ser Pro Asn Ala Asp Ala Ile Leu Lys Leu Met Arg Asp Gln
 210 215
 Ile Ile Met Ala Lys Ala Tyr Ala Asn Ile Ala Lys Ser Lys Asn Val
 225 230 235 240
 Thr Asn Leu Tyr Val Phe Leu Met Gln Gln Cys Gly Glu Asn Lys Arg
 245 250 255
 Val Ile Gly Lys Ala Thr Ser Asp Ala Asp Leu Pro Ser Ser Ala Leu
 260 265 270
 Asp Gln Ala Lys Ala Met Gly His Ala Leu Ser Leu Ala Lys Asp Glu
 275 280 285
 Leu Tyr Asp Cys His Glu Leu Ala Lys Lys Phe Arg Ala Ile Leu Gln
 290 295 300
 Ser Thr Glu Arg Lys Val Asp Gly Leu Lys Lys Lys Gly Thr Phe Leu
 305 310 315 320
 Ile Gln Leu Ala Ala Lys Thr Phe Pro Lys Pro Leu His Cys Leu Ser
 325 330 335
 Leu Gln Leu Ala Ala Asp Tyr Phe Ile Leu Gly Phe Asn Glu Glu Asp
 340 345 350
 Ala Val Lys Glu Asp Val Ser Gln Lys Lys Leu Glu Asp Pro Ser Leu
 355 360 365
 Tyr His Tyr Ala Ile Phe Ser Asp Asn Val Leu Ala Thr Ser Val Val
 370 375 380
 Val Asn Ser Thr Val Leu Asn Ala Lys Glu Pro Gln Arg His Val Phe
 385 390 395 400
 His Ile Val Thr Asp Lys Leu Asn Phe Gly Ala Met Lys Met Trp Phe
 405 410 415
 Arg Ile Asn Ala Pro Ala Asp Ala Thr Ile Gln Val Glu Asn Ile Asn
 420 425 430
 Asp Phe Lys Trp Leu Asn Ser Ser Tyr Cys Ser Val Leu Arg Gln Leu
 435 440 445

14-03 WO.sequence listing.txt

Glu Ser Ala Arg Leu Lys Glu Tyr Tyr Phe Lys Ala Asn His Pro Ser
 450 455 460
 Ser Ile Ser Ala Gly Ala Asp Asn Leu Lys Tyr Arg Asn Pro Lys Tyr
 465 470 475 480
 Leu Ser Met Leu Asn His Leu Arg Phe Tyr Leu Pro Glu Val Tyr Pro
 485 490 495
 Lys Leu Glu Lys Ile Leu Phe Leu Asp Asp Asp Ile Val Val Gln Lys
 500 505 510
 Asp Leu Ala Pro Leu Trp Glu Ile Asp Met Gln Gly Lys Val Asn Gly
 515 520 525
 Ala Val Glu Thr Cys Lys Glu Ser Phe His Arg Phe Asp Lys Tyr Leu
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 Asn Phe Ser Asn Pro Lys Ile Ser Glu Asn Phe Asp Ala Gly Ala Cys
 545 550 555 560
 Gly Trp Ala Phe Gly Met Asn Met Phe Asp Leu Lys Glu Trp Arg Lys
 565 570 575
 Arg Asn Ile Thr Gly Ile Tyr His Tyr Trp Gln Asp Leu Asn Glu Asp
 580 585 590
 Arg Thr Leu Trp Lys Leu Gly Ser Leu Pro Pro Gly Leu Ile Thr Phe
 595 600 605
 Tyr Asn Leu Thr Tyr Ala Met Asp Arg Ser Trp His Val Leu Gly Leu
 610 615 620
 Gly Tyr Asp Pro Ala Leu Asn Gln Thr Ala Ile Glu Asn Ala Ala Val
 625 630 635 640
 Val His Tyr Asn Gly Asn Tyr Lys Pro Trp Leu Gly Leu Ala Phe Ala
 645 650 655
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<210> 27
 <211> 1599

14-03 WO.sequence listing.txt

<212> DNA

<213> *Arabidopsis thaliana*

<400> 27

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<210> 28

<211> 532

<212> PRT

<213> *Arabidopsis thaliana*

14-03 WO.sequence listing.txt

<400> 28

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 Ser Asn Glu Phe Ile Asp Leu Met Lys Ile Lys Val Ala Ala Arg His
 20 25 30
 Ile Ser Tyr Arg Thr Leu Phe His Thr Ile Leu Ile Leu Ala Phe Leu
 35 40 45
 Leu Pro Phe Val Phe Ile Leu Thr Ala Val Val Thr Leu Glu Gly Val
 50 55 60
 Asn Lys Cys Ser Ser Ile Asp Cys Leu Gly Arg Arg Ile Gly Pro Arg
 65 70 75 80
 Leu Leu Gly Arg Val Asp Asp Ser Glu Arg Leu Ala Arg Asp Phe Tyr
 85 90 95
 Lys Ile Leu Asn Glu Val Ser Thr Gln Glu Ile Pro Asp Gly Leu Lys
 100 105 110
 Leu Pro Asn Ser Phe Ser Gln Leu Val Ser Asp Met Lys Asn Asn His
 115 120 125
 Tyr Asp Ala Lys Thr Phe Ala Leu Val Leu Arg Ala Met Met Glu Lys
 130 135 140
 Phe Glu Arg Asp Met Arg Glu Ser Lys Phe Ala Glu Leu Met Asn Lys
 145 150 155 160
 His Phe Ala Ala Ser Ser Ile Pro Lys Gly Ile His Cys Leu Ser Leu
 165 170 175
 Arg Leu Thr Asp Glu Tyr Ser Ser Asn Ala His Ala Arg Arg Gln Leu
 180 185 190
 Pro Ser Pro Glu Phe Leu Pro Val Leu Ser Asp Asn Ala Tyr His His
 195 200 205
 Phe Ile Leu Ser Thr Asp Asn Ile Leu Ala Ala Ser Val Val Val Ser
 210 215 220
 Ser Ala Val Gln Ser Ser Ser Lys Pro Glu Lys Ile Val Phe His Ile
 225 230 235 240

14-03 WO.sequence listing.txt

Ile Thr Asp Lys Lys Thr Tyr Ala Gly Met His Ser Trp Phe Ala Leu
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 Asn Ser Val Ala Pro Ala Ile Val Glu Val Lys Gly Val His Gln Phe
 260 265 270
 Asp Trp Leu Thr Arg Glu Asn Val Pro Val Leu Glu Ala Val Glu Ser
 275 280 285
 His Asn Gly Val Arg Asp Tyr Tyr His Gly Asn His Val Ala Gly Ala
 290 295 300
 Asn Leu Thr Glu Thr Thr Pro Arg Thr Phe Ala Ser Lys Leu Gln Ser
 305 310 315
 Arg Ser Pro Lys Tyr Ile Ser Leu Leu Asn His Leu Arg Ile Tyr Ile
 325 330 335
 Pro Glu Leu Phe Pro Asn Leu Asp Lys Val Val Phe Leu Asp Asp Asp
 340 345 350
 Ile Val Val Gln Gly Asp Leu Thr Pro Leu Trp Asp Val Asp Leu Gly
 355 360 365
 Gly Lys Val Asn Gly Ala Val Glu Thr Cys Arg Gly Glu Asp Glu Trp
 370 375 380
 Val Met Ser Lys Arg Leu Arg Asn Tyr Phe Asn Phe Ser His Pro Leu
 385 390 395 400
 Ile Ala Lys His Leu Asp Pro Glu Glu Cys Ala Trp Ala Tyr Gly Met
 405 410 415
 Asn Ile Phe Asp Leu Gln Ala Trp Arg Lys Thr Asn Ile Arg Glu Thr
 420 425 430
 Tyr His Ser Trp Leu Arg Glu Asn Leu Lys Ser Asn Leu Thr Met Trp
 435 440 445
 Lys Leu Gly Thr Leu Pro Pro Ala Leu Ile Ala Phe Lys Gly His Val
 450 455 460
 His Ile Ile Asp Ser Ser Trp His Met Leu Gly Leu Gly Tyr Gln Ser
 465 470 475 480
 Lys Thr Asn Ile Glu Asn Val Lys Lys Ala Ala Val Ile His Tyr Asn
 485 490 495

14-03 WO.sequence listing.txt

Gly Gln Ser Lys Pro Trp Leu Glu Ile Gly Phe Glu His Leu Arg Pro
 500 505 510

Phe Trp Thr Lys Tyr Val Asn Tyr Ser Asn Asp Phe Ile Lys Asn Cys
 515 520 525

His Ile Leu Glu
 530

<210> 29
 <211> 1608
 <212> DNA
 <213> Arabidopsis thaliana

<400> 29
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 gatttcatgt ctgaagtcaa aagaagcaaa tcagacgcaa gagaatttgc tcaaaagcta 420
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 ccgacaattg ccaaaaactt caatccagag gaatgtgcat gggcttatgg aatgaatgtt 1260
 ttcgacctag cggcttggag gaggactaac ataagctcca cttactatca ttggcttgac 1320

14-03 WO.sequence listing.txt

gagaacttaa aatcagacct gagtttgtgg cagctgggaa ctttgccctcc tgggctgatt 1380
 gctttccacg gtcattgtcca aaccatagat ccgttctggc atatgcttgg tctcggatac 1440
 caagagacca cgagctatgc cgatgctgaa agtgccgctg ttgttcattt caatggaaga 1500
 gctaagcctt ggctggatat agcatttcct catctacgtc ctctctgggc taagtatctt 1560
 gattcttctg acagatttat caagagctgt cacattagag catcatga 1608

<210> 30
 <211> 535
 <212> PRT
 <213> Arabidopsis thaliana

<400> 30

Met Gln Leu His Ile Ser Pro Ser Leu Arg His Val Thr Val Val Thr
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Gly Lys Gly Leu Arg Glu Phe Ile Lys Val Lys Val Gly Ser Arg Arg
20 25 30

Phe Ser Tyr Gln Met Val Phe Tyr Ser Leu Leu Phe Phe Thr Phe Leu
35 40 45

Leu Arg Phe Val Phe Val Leu Ser Thr Val Asp Thr Ile Asp Gly Asp
50 55 60

Pro Ser Pro Cys Ser Ser Leu Ala Cys Leu Gly Lys Arg Leu Lys Pro
65 70 75 80

Lys Leu Leu Gly Arg Arg Val Asp Ser Gly Asn Val Pro Glu Ala Met
85 90 95

Tyr Gln Val Leu Glu Gln Pro Leu Ser Glu Gln Glu Leu Lys Gly Arg
100 105 110

Ser Asp Ile Pro Gln Thr Leu Gln Asp Phe Met Ser Glu Val Lys Arg
115 120 125

Ser Lys Ser Asp Ala Arg Glu Phe Ala Gln Lys Leu Lys Glu Met Val
130 135 140

Thr Leu Met Glu Gln Arg Thr Arg Thr Ala Lys Ile Gln Glu Tyr Leu
145 150 155 160

Tyr Arg His Val Ala Ser Ser Ser Ile Pro Lys Gln Leu His Cys Leu
165 170 175

Ala Leu Lys Leu Ala Asn Glu His Ser Ile Asn Ala Ala Ala Arg Leu

14-03 WO.sequence listing.txt

180

185

190

Gln Leu Pro Glu Ala Glu Leu Val Pro Met Leu Val Asp Asn Asn Tyr
 195 200 205
 Phe His Phe Val Leu Ala Ser Asp Asn Ile Leu Ala Ala Ser Val Val
 210 215 220
 Ala Lys Ser Leu Val Gln Asn Ala Leu Arg Pro His Lys Ile Val Leu
 225 230 235 240
 His Ile Ile Thr Asp Arg Lys Thr Tyr Phe Pro Met Gln Ala Trp Phe
 245 250 255
 Ser Leu His Pro Leu Ser Pro Ala Ile Ile Glu Val Lys Ala Leu His
 260 265 270
 His Phe Asp Trp Leu Ser Lys Gly Lys Val Pro Val Leu Glu Ala Met
 275 280 285
 Glu Lys Asp Gln Arg Val Arg Ser Gln Phe Arg Gly Gly Ser Ser Val
 290 295 300
 Ile Val Ala Asn Asn Lys Glu Asn Pro Val Val Val Ala Ala Lys Leu
 305 310 315 320
 Gln Ala Leu Ser Pro Lys Tyr Asn Ser Leu Met Asn His Ile Arg Ile
 325 330 335
 His Leu Pro Glu Leu Phe Pro Ser Leu Asn Lys Val Val Phe Leu Asp
 340 345 350
 Asp Asp Ile Val Ile Gln Thr Asp Leu Ser Pro Leu Trp Asp Ile Asp
 355 360 365
 Met Asn Gly Lys Val Asn Gly Ala Val Glu Thr Cys Arg Gly Glu Asp
 370 375 380
 Lys Phe Val Met Ser Lys Lys Phe Lys Ser Tyr Leu Asn Phe Ser Asn
 385 390 395 400
 Pro Thr Ile Ala Lys Asn Phe Asn Pro Glu Glu Cys Ala Trp Ala Tyr
 405 410 415
 Gly Met Asn Val Phe Asp Leu Ala Ala Trp Arg Arg Thr Asn Ile Ser
 420 425 430

14-03 WO.sequence listing.txt

Ser Thr Tyr Tyr His Trp Leu Asp Glu Asn Leu Lys Ser Asp Leu Ser
 435 440 445

Leu Trp Gln Leu Gly Thr Leu Pro Pro Gly Leu Ile Ala Phe His Gly
 450 455 460

His Val Gln Thr Ile Asp Pro Phe Trp His Met Leu Gly Leu Gly Tyr
 465 470 475 480

Gln Glu Thr Thr Ser Tyr Ala Asp Ala Glu Ser Ala Ala Val Val His
 485 490 495

Phe Asn Gly Arg Ala Lys Pro Trp Leu Asp Ile Ala Phe Pro His Leu
 500 505 510

Arg Pro Leu Trp Ala Lys Tyr Leu Asp Ser Ser Asp Arg Phe Ile Lys
 515 520 525

Ser Cys His Ile Arg Ala Ser
 530 535

<210> 31
 <211> 1086
 <212> DNA
 <213> Arabidopsis thaliana

<400> 31
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 tctccttcgc tccaatcctt ttctccggcg gcagctatcc gatcatctca cccctacgcc 120
 gacgaattca aacccaaca aaactccgat tactcctcct tcagagaatc tccaatgttc 180
 cgtaacgccg aacaatgcag atcttccggc gaagattccg gcgtctgtaa ccctaattctc 240
 gtccacgtag ccatcactct cgacatcgat tacctccgtg gctcaatcgc agccgtcaat 300
 tcgatcctcc agcactcaat gtgccctcaa agcgtcttct tccacttcct cgtctcctcc 360
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 ttagagcaac cgttgaatta cgccagaaat tacttggcgg atctgctcga gccttgcggtt 540
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 aaatacttca ccggagggtt ttggtcagat aagagggtta acgggacgtt caaaggagg 720
 iacccttggt acttcaatac tgggtgtaatg gtgattgatt tgaagaagtg gagacaattt 780
 iaggttcacga aacgaattga gaaatggatg gagattcaga agatagagag gatttatgag 840
 :ttggttctc ttcctccggt tcttctggta tttgctggtc atgtagctcc gatttcacat 900

14-03 WO.sequence listing.txt

cgggtggaatc aacatgggct tgggtggtgat aatgttagag gtagttgccg tgatttgcac 960
 tctgggtcctg tgagtttgct tcactgggtca ggtagtggta agccatgggt aagactcgat 1020
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 cattga 1086

<210> 32
 <211> 361
 <212> PRT
 <213> Arabidopsis thaliana

<400> 32

Met His Trp Ile Thr Arg Phe Ser Ala Phe Phe Ser Ala Ala Leu Ala
 1 5 10 15

Met Ile Leu Leu Ser Pro Ser Leu Gln Ser Phe Ser Pro Ala Ala Ala
 20 25 30

Ile Arg Ser Ser His Pro Tyr Ala Asp Glu Phe Lys Pro Gln Gln Asn
 35 40 45

Ser Asp Tyr Ser Ser Phe Arg Glu Ser Pro Met Phe Arg Asn Ala Glu
 50 55 60

Gln Cys Arg Ser Ser Gly Glu Asp Ser Gly Val Cys Asn Pro Asn Leu
 65 70 75 80

Val His Val Ala Ile Thr Leu Asp Ile Asp Tyr Leu Arg Gly Ser Ile
 85 90 95

Ala Ala Val Asn Ser Ile Leu Gln His Ser Met Cys Pro Gln Ser Val
 100 105 110

Phe Phe His Phe Leu Val Ser Ser Glu Ser Gln Asn Leu Glu Ser Leu
 115 120 125

Ile Arg Ser Thr Phe Pro Lys Leu Thr Asn Leu Lys Ile Tyr Tyr Phe
 130 135 140

Ala Pro Glu Thr Val Gln Ser Leu Ile Ser Ser Ser Val Arg Gln Ala
 145 150 155 160

Leu Glu Gln Pro Leu Asn Tyr Ala Arg Asn Tyr Leu Ala Asp Leu Leu
 165 170 175

Glu Pro Cys Val Lys Arg Val Ile Tyr Leu Asp Ser Asp Leu Val Val
 180 185 190

14-03 WO.sequence listing.txt

Val Asp Asp Ile Val Lys Leu Trp Lys Thr Gly Leu Gly Gln Arg Thr
 195 200 205
 Ile Gly Ala Pro Glu Tyr Cys His Ala Asn Phe Thr Lys Tyr Phe Thr
 210 215 220
 Gly Gly Phe Trp Ser Asp Lys Arg Phe Asn Gly Thr Phe Lys Gly Arg
 225 230 235 240
 Asn Pro Cys Tyr Phe Asn Thr Gly Val Met Val Ile Asp Leu Lys Lys
 245 250
 Trp Arg Gln Phe Arg Phe Thr Lys Arg Ile Glu Lys Trp Met Glu Ile
 260 265 270
 Gln Lys Ile Glu Arg Ile Tyr Glu Leu Gly Ser Leu Pro Pro Phe Leu
 275 280 285
 Leu Val Phe Ala Gly His Val Ala Pro Ile Ser His Arg Trp Asn Gln
 290 295 300
 His Gly Leu Gly Gly Asp Asn Val Arg Gly Ser Cys Arg Asp Leu His
 305 310 315 320
 Ser Gly Pro Val Ser Leu Leu His Trp Ser Gly Ser Gly Lys Pro Trp
 325 330 335
 Leu Arg Leu Asp Ser Lys Leu Pro Cys Pro Leu Asp Thr Leu Trp Ala
 340 345 350
 Pro Tyr Asp Leu Tyr Lys His Ser His
 355 360

<210> 33
 <211> 1038
 <212> DNA
 <213> Arabidopsis thaliana

<400> 33
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 jtcacagtca ctctcactga cctccccgcg tttcgtgaag ctccggcggt tcgaaacggc 120
 igagaatgct ccaaaacgac atggatacct tcggatcacg aacacaaccc atcaatcatc 180
 :acatcgcta tgactctcga cgcaatttac ctccgtggct cagtcgccgg cgtcttctcc 240
 ittctccaac acgcttcttg tcctgaaaac atcgttttcc acttcatcgc cactcaccgt 300
 :gcagcgccg atctccgccg cataatctcc tcaacattcc catacctaac ctaccacatt 360

14-03 WO.sequence listing.txt

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gaccaaccgt taaactacgc tcggatctac ctcgccgatc tcctcccaat cgccgtccgc 480
cgcgtaatct acttcgactc cgatctcgta gtcgtcgatg acgtggctaa actctggaga 540
atcgatctac gtcggcacgt cgtcggagct ccggagtact gtcacgcgaa tttcactaac 600
tactttactt caagattctg gtcgagtcaa ggttacaaat cggcgttgaa agataggaaa 660
ccgtgttatt tcaacaccgg agtgatggtg attgatctcg gaaaatggag agaaaggaga 720
gtcacggtga agctagagac atggatgagg attcaaaaac gacatcgtat ttacgaattg 780
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tggaatcagc atggtcttgg tggtgataac ttggaaggac tttgccggaa tttgcatcca 900
gggccggtga gtttgttgca ttggagcggg aaagggaaac catggctaag gcttgactcg 960
agacgaccgt gtccgttggg ttcgttatgg gtccttatg atttgtttcg ttattcaccg 1020
ttgatctctg atagctga 1038

```

```

<210> 34
<211> 345
<212> PRT
<213> Arabidopsis thaliana

```

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<400> 34

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Met Ser Ser Leu Arg Leu Arg Leu Cys Leu Leu Leu Leu Leu Pro Ile
1      5      10      15

```

```

Thr Ile Ser Cys Val Thr Val Thr Leu Thr Asp Leu Pro Ala Phe Arg
20      25      30

```

```

Glu Ala Pro Ala Phe Arg Asn Gly Arg Glu Cys Ser Lys Thr Thr Trp
35      40      45

```

```

Ile Pro Ser Asp His Glu His Asn Pro Ser Ile Ile His Ile Ala Met
50      55      60

```

```

Thr Leu Asp Ala Ile Tyr Leu Arg Gly Ser Val Ala Gly Val Phe Ser
55      70      75      80

```

```

Val Leu Gln His Ala Ser Cys Pro Glu Asn Ile Val Phe His Phe Ile
85      90      95

```

```

Ala Thr His Arg Arg Ser Ala Asp Leu Arg Arg Ile Ile Ser Ser Thr
100     105     110

```

```

Phe Pro Tyr Leu Thr Tyr His Ile Tyr His Phe Asp Pro Asn Leu Val
115     120     125

```


14-03 WO.sequence listing.txt

Arg Ser Lys Ile Ser Ser Ser Ile Arg Arg Ala Leu Asp Gln Pro Leu
 130 135 140
 Asn Tyr Ala Arg Ile Tyr Leu Ala Asp Leu Leu Pro Ile Ala Val Arg
 145 150 155 160
 Arg Val Ile Tyr Phe Asp Ser Asp Leu Val Val Val Asp Asp Val Ala
 165 170 175
 Lys Leu Trp Arg Ile Asp Leu Arg Arg His Val Val Gly Ala Pro Glu
 180 185 190
 Tyr Cys His Ala Asn Phe Thr Asn Tyr Phe Thr Ser Arg Phe Trp Ser
 195 200 205
 Ser Gln Gly Tyr Lys Ser Ala Leu Lys Asp Arg Lys Pro Cys Tyr Phe
 210 215 220
 Asn Thr Gly Val Met Val Ile Asp Leu Gly Lys Trp Arg Glu Arg Arg
 225 230 235 240
 Val Thr Val Lys Leu Glu Thr Trp Met Arg Ile Gln Lys Arg His Arg
 245 250 255
 Ile Tyr Glu Leu Gly Ser Leu Pro Pro Phe Leu Leu Val Phe Ala Gly
 260 265 270
 Asp Val Glu Pro Val Glu His Arg Trp Asn Gln His Gly Leu Gly Gly
 275 280 285
 Asp Asn Leu Glu Gly Leu Cys Arg Asn Leu His Pro Gly Pro Val Ser
 290 295 300
 Leu Leu His Trp Ser Gly Lys Gly Lys Pro Trp Leu Arg Leu Asp Ser
 305 310 315 320
 Arg Arg Pro Cys Pro Leu Asp Ser Leu Trp Ala Pro Tyr Asp Leu Phe
 325 330 335
 Arg Tyr Ser Pro Leu Ile Ser Asp Ser
 340 345

<210> 35
 <211> 1056
 <212> DNA
 <213> Arabidopsis thaliana

14-03 WO.sequence listing.txt

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<400> 35
atgtcccaac atcttcttct tctcattctc ctctcgctac ttcttcttca taaaccatt 60
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tgccccttaa tcgatgactc cgagtccgac gatgacgtgg tcgccaacc aatcttctgc 180
tcacgtcgag ctgtccacgt ggcgatgaca ctcgacgccg cctacattcg tggctcagtc 240
gccgctgttc tctccgtcct ccaacactct tcttgtcctg aaaacattgt tttccacttc 300
gtcgccctctg cttccgccga cgcttcttcc ttacgagcca ccatatcctc ctctttccct 360
taccttgatt tcaccgtcta cgtcttcaac gtctcctccg tctctcgctt tatctcctcc 420
tctatccgct ccgcactaga ctgtccttta aactacgcaa gaagctacct cgccgatctc 480
ctccctccct gcgtccgccg cgtcgtctac ctagactccg atctgacatc cgtcgacgac 540
atagcaaaac tcgccgccac agatctcggc cgtgattcag tcctcgccgc gccggaatac 600
tgcaacgcca atttcacttc atacttcaca tcaaccttct ggtctaatac gactctctct 660
ttaaccttcg ccgatcggaa agcatgctac ttcaactctg gagtcatggg gatcgatctt 720
tcccgggtggc gcgaaggcgc gtacacgtca cgcacgaag agtggatggc gatgcaaaag 780
agaatgagaa ttacgagct tggttcggtt ccaccgtttt tattggtttt tgccggtttg 840
attaaaccgg ttaatcatcg gtggaaccaa cacggtttag gaggtgataa ttacagagga 900
ctgtgtagag atctccatcc tgggtccggtg agtctgttgc attggagtgg gaaaggtaag 960
ccatgggcta ggcttgatgc tggtcggcct tgtccttttag acgcgctttg ggctccgtat 1020
gatcttcttc aaacgccgtt cgcgttggat tcttga 1056

```

```

<210> 36
<211> 351
<212> PRT
<213> Arabidopsis thaliana

```

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<400> 36

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Met Ser Gln His Leu Leu Leu Leu Ile Leu Leu Ser Leu Leu Leu Leu
1           5           10           15

```

```

His Lys Pro Ile Ser Ala Thr Thr Ile Ile Gln Lys Phe Lys Glu Ala
20           25           30

```

```

Pro Gln Phe Tyr Asn Ser Ala Asp Cys Pro Leu Ile Asp Asp Ser Glu
35           40           45

```

```

Ser Asp Asp Asp Val Val Ala Lys Pro Ile Phe Cys Ser Arg Arg Ala
50           55           60

```

```

Val His Val Ala Met Thr Leu Asp Ala Ala Tyr Ile Arg Gly Ser Val
65           70           75           80

```

Ala	Ala	Val	Leu	Ser	Val	Leu	Gln	His	Ser	Ser	Cys	Pro	Glu	Asn	Ile
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Val	Phe	His	Phe	Val	Ala	Ser	Ala	Ser	Ala	Asp	Ala	Ser	Ser	Leu	Arg
			100					105					110		
Ala	Thr	Ile	Ser	Ser	Ser	Phe	Pro	Tyr	Leu	Asp	Phe	Thr	Val	Tyr	Val
		115					120					125			
Phe	Asn	Val	Ser	Ser	Val	Ser	Arg	Leu	Ile	Ser	Ser	Ser	Ile	Arg	Ser
	130					135					140				
Ala	Leu	Asp	Cys	Pro	Leu	Asn	Tyr	Ala	Arg	Ser	Tyr	Leu	Ala	Asp	Leu
145					150					155					160
Leu	Pro	Pro	Cys	Val	Arg	Arg	Val	Val	Tyr	Leu	Asp	Ser	Asp	Leu	Ile
				165					170					175	
Leu	Val	Asp	Asp	Ile	Ala	Lys	Leu	Ala	Ala	Thr	Asp	Leu	Gly	Arg	Asp
			180					185					190		
Ser	Val	Leu	Ala	Ala	Pro	Glu	Tyr	Cys	Asn	Ala	Asn	Phe	Thr	Ser	Tyr
		195					200					205			
Phe	Thr	Ser	Thr	Phe	Trp	Ser	Asn	Pro	Thr	Leu	Ser	Leu	Thr	Phe	Ala
	210					215					220				
Asp	Arg	Lys	Ala	Cys	Tyr	Phe	Asn	Thr	Gly	Val	Met	Val	Ile	Asp	Leu
225					230					235					240
Ser	Arg	Trp	Arg	Glu	Gly	Ala	Tyr	Thr	Ser	Arg	Ile	Glu	Glu	Trp	Met
				245					250					255	
Ala	Met	Gln	Lys	Arg	Met	Arg	Ile	Tyr	Glu	Leu	Gly	Ser	Leu	Pro	Pro
			260					265					270		
Phe	Leu	Leu	Val	Phe	Ala	Gly	Leu	Ile	Lys	Pro	Val	Asn	His	Arg	Trp
		275					280					285			
Asn	Gln	His	Gly	Leu	Gly	Gly	Asp	Asn	Phe	Arg	Gly	Leu	Cys	Arg	Asp
	290					295					300				
Leu	His	Pro	Gly	Pro	Val	Ser	Leu	Leu	His	Trp	Ser	Gly	Lys	Gly	Lys
305					310					315					320
Pro	Trp	Ala	Arg	Leu	Asp	Ala	Gly	Arg	Pro	Cys	Pro	Leu	Asp	Ala	Leu

325 14-03 WO.sequence listing.txt 335
330

Trp Ala Pro Tyr Asp Leu Leu Gln Thr Pro Phe Ala Leu Asp Ser
340 345 350

<210> 37
<211> 1182
<212> DNA
<213> Arabidopsis thaliana

<400> 37
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aataatgggt ttagtaaact tgggtccgttt atggaagctc cggagtatag aaacggcaag 180
gagtgtgtat cttcatcagt gaacagagag aacttcgtgt cgtcttcttc tagttctaata 240
gatccttcgc ttgttcacat cgctatgact ttggactcag agtatctccg tggatcaatc 300
gcagccggtt attctgttct tcgccacgcg tcttgtccag agaacgtctt cttccatttc 360
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tcttcttcga ttagactagc tttggagaat ccgttgaact atgctcggaa ctatctcgga 540
gatattcttg atcgaagtgt tgaacgagtc atttatcttg actcggatgt tataactgtg 600
gatgatatca caaagctttg gaacacgggt ttgaccgggt cacgagtcac cggagctccg 660
gagtattgtc acgcgaactt cactcagtat ttcacttccg ggttctggtc agacccgggt 720
ttaccgggtc taatctcggg tcaaaagcct tgctatttca acacaggagt gatggtgatg 780
gatcttggtt gatggagaga agggaattac agagagaagt tagagcaatg gatgcaattg 840
cagaagaaga tgagaatcta cgatcttgga tcattaccac cgtttctttt ggtggttgcg 900
ggtaatgttg aagctattga tcatagatgg aaccaacatg gtttaggagg agacaatata 960
cgaggaagtt gtcgggtcatt gcatcctggt cctgtgagct tgttgcattg gagggtgaaa 1020
ggtaagccat gggtttagact tgatgagaag aggccttgct cgttggatca tctttgggag 1080
ccatatgatt tgtataagca taagattgag agagctaaag atcagtcctc gcttgggttt 1140
gcttctctgt cggagttgac tgatgattca agcttcttgt ga 1182

<210> 38
<211> 393
<212> PRT
<213> Arabidopsis thaliana

<400> 38

Met Ser Ser Arg Phe Ser Leu Thr Val Val Cys Leu Ile Ala Leu Leu
1 5 10 15

14-03 WO.sequence listing.txt

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Pro Phe Val Val Gly Ile Arg Leu Ile Pro Ala Arg Ile Thr Ser Val
      20      25      30
Gly Asp Gly Gly Gly Gly Gly Gly Asn Asn Gly Phe Ser Lys Leu Gly
      35      40      45
Pro Phe Met Glu Ala Pro Glu Tyr Arg Asn Gly Lys Glu Cys Val Ser
      50      55      60
Ser Ser Val Asn Arg Glu Asn Phe Val Ser Ser Ser Ser Ser Ser Asn
      65      70      75      80
Asp Pro Ser Leu Val His Ile Ala Met Thr Leu Asp Ser Glu Tyr Leu
      85      90      95
Arg Gly Ser Ile Ala Ala Val His Ser Val Leu Arg His Ala Ser Cys
      100      105      110
Pro Glu Asn Val Phe Phe His Phe Ile Ala Ala Glu Phe Asp Ser Ala
      115      120      125
Ser Pro Arg Val Leu Ser Gln Leu Val Arg Ser Thr Phe Pro Ser Leu
      130      135      140
Asn Phe Lys Val Tyr Ile Phe Arg Glu Asp Thr Val Ile Asn Leu Ile
      145      150      155      160
Ser Ser Ser Ile Arg Leu Ala Leu Glu Asn Pro Leu Asn Tyr Ala Arg
      165      170      175
Asn Tyr Leu Gly Asp Ile Leu Asp Arg Ser Val Glu Arg Val Ile Tyr
      180      185      190
Leu Asp Ser Asp Val Ile Thr Val Asp Asp Ile Thr Lys Leu Trp Asn
      195      200      205
Thr Val Leu Thr Gly Ser Arg Val Ile Gly Ala Pro Glu Tyr Cys His
      210      215      220
Ala Asn Phe Thr Gln Tyr Phe Thr Ser Gly Phe Trp Ser Asp Pro Ala
      225      230      235      240
Leu Pro Gly Leu Ile Ser Gly Gln Lys Pro Cys Tyr Phe Asn Thr Gly
      245      250      255
Val Met Val Met Asp Leu Val Arg Trp Arg Glu Gly Asn Tyr Arg Glu

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260

265

270

Lys Leu Glu Gln Trp Met Gln Leu Gln Lys Lys Met Arg Ile Tyr Asp
 275 280 285

Leu Gly Ser Leu Pro Pro Phe Leu Leu Val Phe Ala Gly Asn Val Glu
 290 295 300

Ala Ile Asp His Arg Trp Asn Gln His Gly Leu Gly Gly Asp Asn Ile
 305 310 315 320

Arg Gly Ser Cys Arg Ser Leu His Pro Gly Pro Val Ser Leu Leu His
 325 330 335

Trp Ser Gly Lys Gly Lys Pro Trp Val Arg Leu Asp Glu Lys Arg Pro
 340 345 350

Cys Pro Leu Asp His Leu Trp Glu Pro Tyr Asp Leu Tyr Lys His Lys
 355 360 365

Ile Glu Arg Ala Lys Asp Gln Ser Leu Leu Gly Phe Ala Ser Leu Ser
 370 375 380

Glu Leu Thr Asp Asp Ser Ser Phe Leu
 385 390

<210> 39
 <211> 1173
 <212> DNA
 <213> Arabidopsis thaliana

<400> 39
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 accgtcggaa atggctttga tctggggtcg ttcgtggaag ctccggagta cagaaacggc 180
 aaggagtgcg tgtctcaatc gttgaacaga gaaaacttcg tgcgtcttg cgacgcttcg 240
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 cattcaatgc tccgccacgc gtcgtgtcca gaaaacgtct tcttccatct catcgtgca 360
 gagtttgacc cggcgagtcc acgcgttctg agtcaactcg tccgatctac tttcccgtcg 420
 ctaaacttca aagtctacat tttccgggaa gatacgggtga tcaaccttat ctcttcttca 480
 atcagacaag ctttagagaa tccattgaac tatgctcggg actacctcgg agatattctt 540
 gatccatgcg tagacagagt catttaccta gactcggaca tcatcgtcgt cgatgacata 600
 acaaagcttt ggaacacgag tttgacaggg tcaagaatca tcggagctcc ggagtattgt 660

14-03 WO.sequence listing.txt

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cacgctaact tcacaaagta cttcacttca ggtttctggt ccgacccggc tttaccgggt      720
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agatgggagag aaggaaacta cagagaaaag cttgaaactt ggatgcagat acagaagaag      840
aagagaatct acgatttggg ttctttgcct ccgtttcttc ttgtcttcgc aggggaacgtt      900
gaagcaattg atcatagggtg gaaccaacat ggtttaggag gagacaatgt acgaggaagt      960
tgtaggtctt tgcataaagg accagtgagt ttgttgcatc ggagtggtaa aggtaagcca     1020
tgggtgagac ttgatgagaa gagaccgtgt ccgttggtatc atttatggga accgtatgat     1080
ttatatgagc ataagattga aagagctaaa gatcagtcctt tgttcggggt ctcttctttg     1140
tctgagttaa cagaagattc aagctttttc tga                                     1173

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<210> 40
 <211> 390
 <212> PRT
 <213> Arabidopsis thaliana

<400> 40

Met Arg Leu Arg Phe Pro Met Lys Ser Ala Val Leu Ala Phe Ala Ile
 1 5 10 15

Phe Leu Val Phe Ile Pro Leu Phe Ser Val Gly Ile Arg Met Ile Pro
 20 25 30

Gly Arg Leu Thr Ala Val Ser Ala Thr Val Gly Asn Gly Phe Asp Leu
 35 40 45

Gly Ser Phe Val Glu Ala Pro Glu Tyr Arg Asn Gly Lys Glu Cys Val
 50 55 60

Ser Gln Ser Leu Asn Arg Glu Asn Phe Val Ser Ser Cys Asp Ala Ser
 65 70 75 80

Leu Val His Val Ala Met Thr Leu Asp Ser Glu Tyr Leu Arg Gly Ser
 85 90 95

Ile Ala Ala Val His Ser Met Leu Arg His Ala Ser Cys Pro Glu Asn
 100 105 110

Val Phe Phe His Leu Ile Ala Ala Glu Phe Asp Pro Ala Ser Pro Arg
 115 120 125

Val Leu Ser Gln Leu Val Arg Ser Thr Phe Pro Ser Leu Asn Phe Lys
 130 135 140

Val Tyr Ile Phe Arg Glu Asp Thr Val Ile Asn Leu Ile Ser Ser Ser
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145 150 155 160
 Ile Arg Gln Ala Leu Glu Asn Pro Leu Asn Tyr Ala Arg Asn Tyr Leu
 165 170 175
 Gly Asp Ile Leu Asp Pro Cys Val Asp Arg Val Ile Tyr Leu Asp Ser
 180 185 190
 Asp Ile Ile Val Val Asp Asp Ile Thr Lys Leu Trp Asn Thr Ser Leu
 195 200 205
 Thr Gly Ser Arg Ile Ile Gly Ala Pro Glu Tyr Cys His Ala Asn Phe
 210 215 220
 Thr Lys Tyr Phe Thr Ser Gly Phe Trp Ser Asp Pro Ala Leu Pro Gly
 225 230 235 240
 Phe Phe Ser Gly Arg Lys Pro Cys Tyr Phe Asn Thr Gly Val Met Val
 245 250 255
 Met Asp Leu Val Arg Trp Arg Glu Gly Asn Tyr Arg Glu Lys Leu Glu
 260 265 270
 Thr Trp Met Gln Ile Gln Lys Lys Lys Arg Ile Tyr Asp Leu Gly Ser
 275 280 285
 Leu Pro Pro Phe Leu Leu Val Phe Ala Gly Asn Val Glu Ala Ile Asp
 290 295 300
 His Arg Trp Asn Gln His Gly Leu Gly Gly Asp Asn Val Arg Gly Ser
 305 310 315 320
 Cys Arg Ser Leu His Lys Gly Pro Val Ser Leu Leu His Trp Ser Gly
 325 330 335
 Lys Gly Lys Pro Trp Val Arg Leu Asp Glu Lys Arg Pro Cys Pro Leu
 340 345 350
 Asp His Leu Trp Glu Pro Tyr Asp Leu Tyr Glu His Lys Ile Glu Arg
 355 360 365
 Ala Lys Asp Gln Ser Leu Phe Gly Phe Ser Ser Leu Ser Glu Leu Thr
 370 375 380
 Glu Asp Ser Ser Phe Phe
 385 390

14-03 wo.sequence listing.txt

<210> 41

<211> 1056

<212> DNA

<213> Arabidopsis thaliana

<400> 41

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ccaactcttc ctgtttttcag agaagccccg gcttttcgaa acggtgatca atgcgggact      180
cgtgaggctg atcagattca tatcgccatg actctcgaca caaactacct ccgtggcaca      240
atggctgccc ttttgtctct ccttcaacat tccacttgcc ctgaaaacct ctcttttcat      300
ttcctgtccc ttcctcattt cgaaaacgac cttttcacca gcatcaaata aacctttcct      360
tacctaaact tcaagattta tcagtttgat ccaaacctcg tccgcagcaa gatatcgaaa      420
tccatcaggc aagcccttga tcagcctctt aactacgcaa gaatctacct cgcggatata      480
atccctagca gcgttgacag gatcatctac ttagactcag acctcgttgt ggtagacgac      540
atagagaagc tgtggcatgt ggagatggaa ggtaaagtgg tggctgctcc cgagtactgc      600
cacgcaaact tcaccatta tttcacaaga actttctggt cagacccggt attggtcaaa      660
gttcttgaag gaaaacgtcc gtgttatttc aacacagggg tgatggttgt ggatgtaaac      720
aatggagga aaggaatgta tacacagaag gtagaagagt ggatgacaat tcagaagcag      780
aagaggatat accatttggg atcattacct ccgtttctgc tgatattcgc cggatgata      840
aaagcgggta atcataggtg gaaccagcat ggtctaggag gtgataattt cgaaggaaga      900
tgtagaacgt tgcattccgg accgataagt cttcttcact ggagtggaaa aggaagcca      960
tggttaagac tagattcaag gaagccttgt atcgttgatc atctatgggc accgtatgat     1020
ctgtaccgtt catcaagaca ttcattagaa gagtag                                1056

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<210> 42

<211> 351

<212> PRT

<213> Arabidopsis thaliana

<400> 42

```

Met Ala Ser Arg Ser Leu Ser Tyr Thr Gln Leu Leu Gly Leu Leu Ser
1           5           10           15

```

```

Phe Ile Leu Leu Leu Val Thr Thr Thr Thr Met Ala Val Arg Val Gly
           20           25           30

```

```

Val Ile Leu His Lys Pro Ser Ala Pro Thr Leu Pro Val Phe Arg Glu
           35           40           45

```

```

Ala Pro Ala Phe Arg Asn Gly Asp Gln Cys Gly Thr Arg Glu Ala Asp
                               Page 65

```

14-03 WO.sequence listing.txt

50
 55
 60
 Gln Ile His Ile Ala Met Thr Leu Asp Thr Asn Tyr Leu Arg Gly Thr
 65 70 75 80
 Met Ala Ala Val Leu Ser Leu Leu Gln His Ser Thr Cys Pro Glu Asn
 85 90 95
 Leu Ser Phe His Phe Leu Ser Leu Pro His Phe Glu Asn Asp Leu Phe
 100 105 110
 Thr Ser Ile Lys Ser Thr Phe Pro Tyr Leu Asn Phe Lys Ile Tyr Gln
 115 120 125
 Phe Asp Pro Asn Leu Val Arg Ser Lys Ile Ser Lys Ser Ile Arg Gln
 130 135 140
 Ala Leu Asp Gln Pro Leu Asn Tyr Ala Arg Ile Tyr Leu Ala Asp Ile
 145 150 155 160
 Ile Pro Ser Ser Val Asp Arg Ile Ile Tyr Leu Asp Ser Asp Leu Val
 165 170 175
 Val Val Asp Asp Ile Glu Lys Leu Trp His Val Glu Met Glu Gly Lys
 180 185 190
 Val Val Ala Ala Pro Glu Tyr Cys His Ala Asn Phe Thr His Tyr Phe
 195 200 205
 Thr Arg Thr Phe Trp Ser Asp Pro Val Leu Val Lys Val Leu Glu Gly
 210 215 220
 Lys Arg Pro Cys Tyr Phe Asn Thr Gly Val Met Val Val Asp Val Asn
 225 230 235 240
 Lys Trp Arg Lys Gly Met Tyr Thr Gln Lys Val Glu Glu Trp Met Thr
 245 250 255
 Ile Gln Lys Gln Lys Arg Ile Tyr His Leu Gly Ser Leu Pro Pro Phe
 260 265 270
 Leu Leu Ile Phe Ala Gly Asp Ile Lys Ala Val Asn His Arg Trp Asn
 275 280 285
 Gln His Gly Leu Gly Gly Asp Asn Phe Glu Gly Arg Cys Arg Thr Leu
 290 295 300

14-03 WO.sequence listing.txt

His Pro Gly Pro Ile Ser Leu Leu His Trp Ser Gly Lys Gly Lys Pro
 305 310 315 320

Trp Leu Arg Leu Asp Ser Arg Lys Pro Cys Ile Val Asp His Leu Trp
 325 330 335

Ala Pro Tyr Asp Leu Tyr Arg Ser Ser Arg His Ser Leu Glu Glu
 340 345 350

<210> 43
 <211> 1098
 <212> DNA
 <213> Arabidopsis thaliana

<400> 43
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 tctttcttca ccgttgaatc gattcgacta ttccctgatt cattcgacga tgcattctca 120
 gatttaattgg aagctccagc atatcaaac ggtcttgatt gctctgtttt agccaaaaac 180
 agactcttgt tagcttgatg tccatcagct gttcatatag ctatgactct agatccagct 240
 tacttgcggtg gcacgggtatc tgcagtacat tccatcctca aacacacttc ttgccctgaa 300
 aacatcttct tccacttcat tgcttcgggt acaagtcagg gttccctcgc caagacccta 360
 tcctctgttt ttcttcttt gagtttcaa gtctatacct ttgaagaaac cacggtcaag 420
 aatctaattct cttcttctat aagacaagct cttgatagtc ctttgaatta cgcaagaagc 480
 tacttatccg agattctttc ttcgtgtgtt agtcgagtga tttatctcga ttcggatgtg 540
 attgtggtcg atgatattca gaaactatgg aagatttctt tatccgggtc aagaacaatc 600
 ggtgcaccag agtattgccg cgcaaatttc accaaatact tcacagatag tttctggtcc 660
 gatcaaaaac tctcgagtgt cttcgattcc aagactcctt gttatttcaa cacaggagtg 720
 atgggttatcg atttagagcg atggagagaa ggagattaca cgagaaagat cgaaaactgg 780
 atgaagattc agaaagaaga taagagaatc tacgaattgg gttctttacc accgtttctt 840
 ctagtgtttg gtggtgatat tgaagctatt gatcatcaat ggaaccaaca cgggtctcgg 900
 ggagacaaca ttgtgagtag ttgtagatct ttgcatcctg gtccgggttag tttgatacat 960
 tggagtggta aaggggaagcc atggggttagg cttgatgatg gtaagccttg tccaattgat 1020
 tatctttggg ctccttatga tcttcacaag tcacagaggc agtatcttca atacaatcaa 1080
 gagttagaaa ttctttga 1098

<210> 44
 <211> 365
 <212> PRT
 <213> Arabidopsis thaliana

<400> 44

14-03 WO.sequence listing.txt

Met Met Ser Gly Ser Arg Leu Ala Ser Arg Leu Ile Ile Ile Phe Ser
 1 5 10 15
 Ile Ile Ser Thr Ser Phe Phe Thr Val Glu Ser Ile Arg Leu Phe Pro
 20 25 30
 Asp Ser Phe Asp Asp Ala Ser Ser Asp Leu Met Glu Ala Pro Ala Tyr
 35 40 45
 Gln Asn Gly Leu Asp Cys Ser Val Leu Ala Lys Asn Arg Leu Leu Leu
 50 55 60
 Ala Cys Asp Pro Ser Ala Val His Ile Ala Met Thr Leu Asp Pro Ala
 65 70 75 80
 Tyr Leu Arg Gly Thr Val Ser Ala Val His Ser Ile Leu Lys His Thr
 85 90 95
 Ser Cys Pro Glu Asn Ile Phe Phe His Phe Ile Ala Ser Gly Thr Ser
 100 105 110
 Gln Gly Ser Leu Ala Lys Thr Leu Ser Ser Val Phe Pro Ser Leu Ser
 115 120 125
 Phe Lys Val Tyr Thr Phe Glu Glu Thr Thr Val Lys Asn Leu Ile Ser
 130 135 140
 Ser Ser Ile Arg Gln Ala Leu Asp Ser Pro Leu Asn Tyr Ala Arg Ser
 145 150 155 160
 Tyr Leu Ser Glu Ile Leu Ser Ser Cys Val Ser Arg Val Ile Tyr Leu
 165 170 175
 Asp Ser Asp Val Ile Val Val Asp Asp Ile Gln Lys Leu Trp Lys Ile
 180 185 190
 Ser Leu Ser Gly Ser Arg Thr Ile Gly Ala Pro Glu Tyr Cys His Ala
 195 200 205
 Asn Phe Thr Lys Tyr Phe Thr Asp Ser Phe Trp Ser Asp Gln Lys Leu
 210 215 220
 Ser Ser Val Phe Asp Ser Lys Thr Pro Cys Tyr Phe Asn Thr Gly Val
 225 230 235 240
 Met Val Ile Asp Leu Glu Arg Trp Arg Glu Gly Asp Tyr Thr Arg Lys
 245 250 255

14-03 WO.sequence listing.txt

Ile Glu Asn Trp Met Lys Ile Gln Lys Glu Asp Lys Arg Ile Tyr Glu
260 265 270

Leu Gly Ser Leu Pro Pro Phe Leu Leu Val Phe Gly Gly Asp Ile Glu
275 280 285

Ala Ile Asp His Gln Trp Asn Gln His Gly Leu Gly Gly Asp Asn Ile
290 295 300

Val Ser Ser Cys Arg Ser Leu His Pro Gly Pro Val Ser Leu Ile His
305 310 315 320

Trp Ser Gly Lys Gly Lys Pro Trp Val Arg Leu Asp Asp Gly Lys Pro
325 330 335

Cys Pro Ile Asp Tyr Leu Trp Ala Pro Tyr Asp Leu His Lys Ser Gln
340 345 350

Arg Gln Tyr Leu Gln Tyr Asn Gln Glu Leu Glu Ile Leu
355 360 365

<210> 45
<211> 1026
<212> DNA
<213> Arabidopsis thaliana

<400> 45
atgcactcga agtttatatt atatctcagc atcctcgccg tattcaccgt ctctttcgcc 60
ggcggcgaga gattcaaaga agctccaaag ttcttcaact ccccgagtg tctaaccatc 120
gaaaacgatg aagatttcgt ttgttcagac aaagccatcc acgtggcaat gaccttagac 180
acagcttacc tccgtggctc aatggccgtg attctctccg tctccaaca ctcttcttgt 240
cctcaaaaca ttgttttcca cttcgtcact tcaaaacaaa gccaccgact ccaaaactac 300
gtcgttgctt cttttcccta cttgaaattc cgaatttacc cttacgacgt agccgccatc 360
tccggcctca tctcaacctc catccgctcc gcgctagact ctccgctaaa ctacgcaaga 420
aactacctcg ccgacattct tcccacgtgc ctctcacgtg tcgtatacct agactcagat 480
ctcatactcg tcgatgacat ctccaagctc ttctccactc acatccctac cgacgtcggt 540
ttagccgcgc ctgagtactg caacgcaaac ttcacgactt actttactcc gacgttttgg 600
tcaaaccctt ctctctccat cacactatcc ctcaaccgcc gtgctacacc gtgttacttc 660
aacaccggag tgatgggcat cgagttaaag aaatggcgag aaggagatta cacgaggaag 720
atcatagagt ggatggagtt acaaaaacgg ataagaatct acgagttagg ctctttacca 780
ccgtttttac ttgtcttcgc cggaacata gctccggtag atcaccggtg gaaccaacac 840

14-03 WO.sequence listing.txt

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ggtttaggag gagataattt tagaggactg tgtcgagatt tgcattcagg tccagtgagt    900
ttgttgcatt ggagtgggaa aggggaagcca tgggtaaggt tagatgatgg tcgaccttgc    960
ccgcttgatg cactttgggt tccatatgat ttgtagagt cacggttcga ccttatcgag    1020
agttaa                                1026

```

```

<210> 46
<211> 341
<212> PRT
<213> Arabidopsis thaliana

```

```

<400> 46

```

```

Met His Ser Lys Phe Ile Leu Tyr Leu Ser Ile Leu Ala Val Phe Thr
1          5          10          15

```

```

Val Ser Phe Ala Gly Gly Glu Arg Phe Lys Glu Ala Pro Lys Phe Phe
          20          25          30

```

```

Asn Ser Pro Glu Cys Leu Thr Ile Glu Asn Asp Glu Asp Phe Val Cys
          35          40          45

```

```

Ser Asp Lys Ala Ile His Val Ala Met Thr Leu Asp Thr Ala Tyr Leu
          50          55          60

```

```

Arg Gly Ser Met Ala Val Ile Leu Ser Val Leu Gln His Ser Ser Cys
65          70          75          80

```

```

Pro Gln Asn Ile Val Phe His Phe Val Thr Ser Lys Gln Ser His Arg
          85          90          95

```

```

Leu Gln Asn Tyr Val Val Ala Ser Phe Pro Tyr Leu Lys Phe Arg Ile
          100          105          110

```

```

Tyr Pro Tyr Asp Val Ala Ala Ile Ser Gly Leu Ile Ser Thr Ser Ile
          115          120          125

```

```

Arg Ser Ala Leu Asp Ser Pro Leu Asn Tyr Ala Arg Asn Tyr Leu Ala
          130          135          140

```

```

Asp Ile Leu Pro Thr Cys Leu Ser Arg Val Val Tyr Leu Asp Ser Asp
          145          150          155          160

```

```

Leu Ile Leu Val Asp Asp Ile Ser Lys Leu Phe Ser Thr His Ile Pro
          165          170          175

```

```

Thr Asp Val Val Leu Ala Ala Pro Glu Tyr Cys Asn Ala Asn Phe Thr
          180          185          190

```

14-03 WO.sequence listing.txt

Thr Tyr Phe Thr Pro Thr Phe Trp Ser Asn Pro Ser Leu Ser Ile Thr
 195 200 205
 Leu Ser Leu Asn Arg Arg Ala Thr Pro Cys Tyr Phe Asn Thr Gly Val
 210 215 220
 Met Val Ile Glu Leu Lys Lys Trp Arg Glu Gly Asp Tyr Thr Arg Lys
 225 230 235 240
 Ile Ile Glu Trp Met Glu Leu Gln Lys Arg Ile Arg Ile Tyr Glu Leu
 245 250 255
 Gly Ser Leu Pro Pro Phe Leu Leu Val Phe Ala Gly Asn Ile Ala Pro
 260 265 270
 Val Asp His Arg Trp Asn Gln His Gly Leu Gly Gly Asp Asn Phe Arg
 275 280 285
 Gly Leu Cys Arg Asp Leu His Pro Gly Pro Val Ser Leu Leu His Trp
 290 295 300
 Ser Gly Lys Gly Lys Pro Trp Val Arg Leu Asp Asp Gly Arg Pro Cys
 305 310 315 320
 Pro Leu Asp Ala Leu Trp Val Pro Tyr Asp Leu Leu Glu Ser Arg Phe
 325 330 335
 Asp Leu Ile Glu Ser
 340

<210> 47
 <211> 1086
 <212> DNA
 <213> Arabidopsis thaliana

<400> 47
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 tctccttctc tccaatcgtt tcttcagct gaagctatca gatccttca tctcgacgt 120
 tacctccgtt tcccctcctc cgatccaccg ccgcatagat tctccttcag aaaagctcct 180
 gttttccgca atgccgccga ttgcgccgcc gcagatatcg attccggcgt ctgtaaccct 240
 tccttgggtc acgtcgcgat tactctcgat ttcgagtacc tgcgtggctc aatcgccgcc 300
 gttcattcga ttctcaagca ctcgtcgtgt cccgagagcg tcttcttcca tttcctcgtc 360
 tccgagactg acctagaatc cttgattcgt tcgacttttc ccgaattgaa attaaaggtt 420
 tactacttcg atccggagat tgtacggacg ctgatctcaa cctccgtgag acaagcgctc 480

14-03 WO.sequence listing.txt

```

gagcagccgt tgaattacgc tagaaattac ctagctgacc ttctcgagcc ttgcgtgcgt      540
cgcgatgatct acctagattc cgatctaatac gtcgtcgacg acatcgcaaa gctctggatg      600
acgaaactgg gatcgaaaac gatcggagct cccgagtact gtcacgcgaa cttcacaaag      660
tatttcacac cggcgttctg gtccgacgag aggttctccg gagctttctc cgggaggaaa      720
ccgtgctact tcaacacggg agtgatggtg atggatctag agagatggag gcgcgtaggg      780
tacacggagg tgatagagaa atggatggag attcagaaga gtgataggat ttacgagctg      840
ggatcattgc cgccgttctt gttggtgttc gccggagaag tagctccgat agagcatcgg      900
tggaaccagc atgggcttgg tggagataac gtgagaggaa gctgtagaga tttacatccc      960
ggtccggtta gcttgcttca ttggtccggt agtggtaaac cgtggtttcg gttagattcg     1020
agacggcctt gtccacttga tactctttgg gcaccttatg atttgatgg acactactct     1080
cgctga                                           1086

```

```

<210> 48
<211> 361
<212> PRT
<213> Arabidopsis thaliana
<400> 48

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```

Met Leu Trp Ile Met Arg Phe Ser Gly Leu Phe Ser Ala Ala Leu Val
1           5           10           15

Ile Ile Val Leu Ser Pro Ser Leu Gln Ser Phe Pro Pro Ala Glu Ala
20           25           30

Ile Arg Ser Ser His Leu Asp Ala Tyr Leu Arg Phe Pro Ser Ser Asp
35           40           45

Pro Pro Pro His Arg Phe Ser Phe Arg Lys Ala Pro Val Phe Arg Asn
50           55           60

Ala Ala Asp Cys Ala Ala Ala Asp Ile Asp Ser Gly Val Cys Asn Pro
65           70           75           80

Ser Leu Val His Val Ala Ile Thr Leu Asp Phe Glu Tyr Leu Arg Gly
85           90           95

Ser Ile Ala Ala Val His Ser Ile Leu Lys His Ser Ser Cys Pro Glu
100          105          110

Ser Val Phe Phe His Phe Leu Val Ser Glu Thr Asp Leu Glu Ser Leu
115          120          125

```


14-03 WO.sequence listing.txt

Ile Arg Ser Thr Phe Pro Glu Leu Lys Leu Lys Val Tyr Tyr Phe Asp
 130 135 140
 Pro Glu Ile Val Arg Thr Leu Ile Ser Thr Ser Val Arg Gln Ala Leu
 145 150 155 160
 Glu Gln Pro Leu Asn Tyr Ala Arg Asn Tyr Leu Ala Asp Leu Leu Glu
 165 170 175
 Pro Cys Val Arg Arg Val Ile Tyr Leu Asp Ser Asp Leu Ile Val Val
 180 185 190
 Asp Asp Ile Ala Lys Leu Trp Met Thr Lys Leu Gly Ser Lys Thr Ile
 195 200 205
 Gly Ala Pro Glu Tyr Cys His Ala Asn Phe Thr Lys Tyr Phe Thr Pro
 210 215 220
 Ala Phe Trp Ser Asp Glu Arg Phe Ser Gly Ala Phe Ser Gly Arg Lys
 225 230 235 240
 Pro Cys Tyr Phe Asn Thr Gly Val Met Val Met Asp Leu Glu Arg Trp
 245 250 255
 Arg Arg Val Gly Tyr Thr Glu Val Ile Glu Lys Trp Met Glu Ile Gln
 260 265 270
 Lys Ser Asp Arg Ile Tyr Glu Leu Gly Ser Leu Pro Pro Phe Leu Leu
 275 280 285
 Val Phe Ala Gly Glu Val Ala Pro Ile Glu His Arg Trp Asn Gln His
 290 295 300
 Gly Leu Gly Gly Asp Asn Val Arg Gly Ser Cys Arg Asp Leu His Pro
 305 310 315 320
 Gly Pro Val Ser Leu Leu His Trp Ser Gly Ser Gly Lys Pro Trp Phe
 325 330 335
 Arg Leu Asp Ser Arg Arg Pro Cys Pro Leu Asp Thr Leu Trp Ala Pro
 340 345 350
 Tyr Asp Leu Tyr Gly His Tyr Ser Arg
 355 360

<210> 49
 <211> 1041
 <212> DNA

14-03 WO.sequence listing.txt

<213> Arabidopsis thaliana

<400> 49

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tctccgtcgc ttcagtcatt tcctccggcg gcggcaatcc gttcttctcc atcaccgatc      120
ttcagaaaag ctccagcggg gttcaacaac ggcgacgaat gtctctcctc cggcggcgctc      180
tgcaatccgt cgttgggtcca cgtggcgatc acgtagacg tagagtacct gcgtgggtca      240
atcgcagccg ttaactcgat ccttcagcac tcggtgtgtc cagagagcgt cttcttccac      300
ttcatcgccg tctccgagga aacaaacctg ttggagtcgc tggtagatc ggttttcccg      360
agactgaaat tcaatattta cgattttgcc cctgagacag ttcgtgggtt gatttcttct      420
tccgtgagac aagctctcga gcagcctctg aactacgcta gaagctactt agcggatctg      480
ctggagcctt gtgttaaccg tgtcatatac ttggattcgg atcttgtcgt cgtcgatgac      540
atcgctaagc tttggaaaac tagcctaggc tcgaggataa tcggagctcc ggagtattgt      600
cacgcgaatt tcacgaaata cttcaccgga ggattctggt cggaggagag attctccggt      660
acctttagag ggaggaagcc atgttacttc aacacaggtg tgatggtgat agatcttaag      720
aatggagaa gaggtgggta cacgaaacgt atcgagaaat ggatggagat tcagagaaga      780
gagaggattt acgaactagg ctcgcttcca ccgtttcttc tagttttctc cggtcacgtg      840
gctcccatct ctcaccggtg gaaccagcat ggacttggtg gtgacaatgt tagaggtagc      900
tgtcgtgatt tgcacctcgg tcctgtgagt ttgctgcatt ggtctggtag tggcaagccc      960
tggataagac tcgattccaa acggccttgt cccttagacg cattatggac gccttacgac     1020
ttgtatcgac attcgcattg a                                     1041

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<210> 50

<211> 346

<212> PRT

<213> Arabidopsis thaliana

<400> 50

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Met Leu Trp Ile Thr Arg Phe Ala Gly Leu Phe Ser Ala Ala Met Ala
1           5           10          15
Val Ile Val Leu Ser Pro Ser Leu Gln Ser Phe Pro Pro Ala Ala Ala
20          25          30
Ile Arg Ser Ser Pro Ser Pro Ile Phe Arg Lys Ala Pro Ala Val Phe
35          40          45
Asn Asn Gly Asp Glu Cys Leu Ser Ser Gly Gly Val Cys Asn Pro Ser
50          55          60

```

14-03 WO.sequence listing.txt

Leu Val His Val Ala Ile Thr Leu Asp Val Glu Tyr Leu Arg Gly Ser
 65 70 75 80
 Ile Ala Ala Val Asn Ser Ile Leu Gln His Ser Val Cys Pro Glu Ser
 85 90 95
 Val Phe Phe His Phe Ile Ala Val Ser Glu Glu Thr Asn Leu Leu Glu
 100 105 110
 Ser Leu Val Arg Ser Val Phe Pro Arg Leu Lys Phe Asn Ile Tyr Asp
 115 120 125
 Phe Ala Pro Glu Thr Val Arg Gly Leu Ile Ser Ser Val Arg Gln
 130 135 140
 Ala Leu Glu Gln Pro Leu Asn Tyr Ala Arg Ser Tyr Leu Ala Asp Leu
 145 150 155 160
 Leu Glu Pro Cys Val Asn Arg Val Ile Tyr Leu Asp Ser Asp Leu Val
 165 170 175
 Val Val Asp Asp Ile Ala Lys Leu Trp Lys Thr Ser Leu Gly Ser Arg
 180 185 190
 Ile Ile Gly Ala Pro Glu Tyr Cys His Ala Asn Phe Thr Lys Tyr Phe
 195 200 205
 Thr Gly Gly Phe Trp Ser Glu Glu Arg Phe Ser Gly Thr Phe Arg Gly
 210 215 220
 Arg Lys Pro Cys Tyr Phe Asn Thr Gly Val Met Val Ile Asp Leu Lys
 225 230 235 240
 Lys Trp Arg Arg Gly Gly Tyr Thr Lys Arg Ile Glu Lys Trp Met Glu
 245 250 255
 Ile Gln Arg Arg Glu Arg Ile Tyr Glu Leu Gly Ser Leu Pro Pro Phe
 260 265 270
 Leu Leu Val Phe Ser Gly His Val Ala Pro Ile Ser His Arg Trp Asn
 275 280 285
 Gln His Gly Leu Gly Gly Asp Asn Val Arg Gly Ser Cys Arg Asp Leu
 290 295 300
 His Pro Gly Pro Val Ser Leu Leu His Trp Ser Gly Ser Gly Lys Pro
 305 310 315 320

14-03 WO.sequence listing.txt

Trp Ile Arg Leu Asp Ser Lys Arg Pro Cys Pro Leu Asp Ala Leu Trp
325 330 335

Thr Pro Tyr Asp Leu Tyr Arg His Ser His
340 345